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THE

# JOURNAL OF THE SOCIETY OF ARTS,

AND OF THE

# INSTITUTIONS IN UNION.

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# SOCIETY OF ARTS.

## FRIDAY, NOVEMBER 26TH, 1852.

The rapid increase which, during the last few years has taken place in the business of the Society of Arts, has rendered it necessary for the Council to make a complete change in the mode of publishing the Society's weekly proceedings, which have, in fact, hitherto contained little more than a condensed account of the papers read at the weekly meetings, and such routine business as from time to time came before the Society. As, however, from the greatly enlarged range of subjects which at present occupy the attention of the Society, and from the many important inquiries which its members are prosecuting, the mere weekly transactions evidently constitute but a small part of the useful labours of the Society, it has been deemed necessary by the Council, to adopt such changes in the weekly publication of the Society, as should render it not merely a record of the proceedings at the Wednesday Evening Meetings, but, in fact, a regular and systematic Journal of the various great and interesting undertakings which the Society is, at present, actively carrying on.

Ever since the Council determined to discontinue the publication of a yearly volume of Transactions, the want of a Journal has been felt and acknowledged, and it has been evident that the printed weekly proceedings did not sufficiently meet this requirement, neither serving as a register of the various important subjects brought before the Society, nor yet even as a means of making the members themselves conversant with the numerous investigations and inquiries carried out by the Committees of the Society. In determining to publish an extended weekly journal, the Council are guided by the fact that while such a paper will prove a more satisfactory means of communicating to the members, and also to the public at large, the proceedings of the Standing Committees, of the Colonial and Foreign Committees, and of the Provincial Institutes Committee, it will, at the same time, also become a means of materially assisting those Committees in the various important matters under their consideration. In no department of the Society's labours, will the new Journal be more useful, than in connection with the General Union of Literary, Scientific, and Mechanics' Institutes just formed, and which already numbers 225 institutions in all parts of the Empire, including, in the whole, upwards of 90,000 members. It will be obvious that the Journal will supply a medium of communication with the members of these Institutions, and will offer facilities in the way of correspondence between them and the Society of Arts, far beyond any mere system of correspondence by letter. This, whilst it will diminish the labour of the Committees of the Society, will, it is hoped, at the same time, greatly increase their power of usefulness.

It is only necessary at present further to state, that the Journal will be conducted by the Secretary, under the immediate control of the Council; that, under proper regulations, its pages will be open to contributions on all subjects connected with the progress of human industry, and the encouragement of arts, manufactures, and commerce; and that, as far as may be found to be practicable, it will, in addition to the proceedings of the Society of Arts, and the Institutions in Union with it, contain brief notices of the proceedings of other similar societies, and, in general, of all matters of scientific or technical interest. The Council, however, will only consider themselves responsible for as much as is signed by their Secretary by order.

## FIRST ORDINARY MEETING,

*Wednesday, November 24th,* 1852.

The first ordinary meeting of the Society was held on Wednesday, the 24th instant, H. Cole, Esq., C. B., in the chair; the following gentlemen were elected members:

Bennock, Francis, Wood-street, Cheapside.
Brown, Robert Charles, 14, Buckingham-street, Adelphi.
Hutton, James, 60, Burton crescent.
Raimondi, Willoughby, 22, Surrey-street, Strand.

and one hundred and thirty-four new members were proposed.

The Secretary announced that two hundred and thirty-one institutions had joined the new Union.

Mr. Cole, as chairman of the Council, read the following Report on the present state and future progress of the Society:

In accordance with the custom of the Society, I have now the pleasure of laying before the Members a brief statement of some of the chief subjects of importance, which have of late occupied the attention of the Council, and to which their future exertions will be directed.

In doing so, I will, in the first instance, remind you, that a few months since, at the close of the last session, the Council in their report on the proceedings of the past year, indicated the general plan of operations which it was intended to carry out; and I shall, therefore, commence by stating to you what progress has been made during the vacation towards promoting these objects.

Early in the spring a special Colonial Committee was appointed for the purpose of corresponding with our various colonies, investigating their numerous little-known productions, endeavouring to improve their manufactures, and to encourage new sources of industry. It is hardly necessary to remark that the establishment of any regular and systematic correspondence of this sort must necessarily take some time,—the importance of such a correspondence is equally obvious; and it is, therefore, satisfactory now to state that the circulars of the Colonial Committee having been approved by the Secretary of State for the Colonies, and transmitted by him to the chief colonies, have been most favourably received by them. In those colonies where societies already existed for the promotion and encouragement of industry, the proposal of the Committee has been most warmly met and seconded; and in other colonies, where no such institutions existed, committees have been nominated by the governors, which, from the names they include, give ample security that no pains will be spared to carry out the views of the Society of Arts. Correspondence is now organized with Jamaica, Trinidad, British Guiana, Montserrat, New Brunswick, Sierra Leone, St. Lucia, Canada, Berbice, Antigua, Grenada and Malta.

This lays the foundation of a scheme which the Society for some time has had in view; namely, the holding of a series of great Colonial Exhibitions.

In reply to the circulars sent out by the Foreign Correspondence Committee, a number of valuable replies have been received, containing accounts of the various Societies instituted in foreign countries for the promotion of natural knowledge, and the application of science to the arts. These, in every case, indicate a most hearty desire to cooperate with the Society of Arts in all possible ways, and to establish a correspondence, which shall not merely be an interchange of compliments and good wishes, but a practical and working exchange of information and experience on all subjects of mutual interest.

In connection with Colonial and Foreign Correspondence, mention must also be made of the International and Colonial Postage Association, which, it will be remembered, arose out of a small committee formed shortly after the opening of the Great Exhibition of 1851. As the amelioration of the postage system is a matter deeply affecting the prosperity of the Society, and indeed it may be said the welfare of the country at large, the Council have willingly afforded such aid as was in their power to the Postage Association; and they rejoice to observe that, during the past few months, it has greatly increased in numbers and influence, and that from the energy and activity with which its operations are conducted, the most important results may be expected.

Some progress has also been made in the collection of trade reports, and statistics generally, a number of valuable statements having been drawn up by members of the Society, and others engaged in business. The Royal Commissioners for the Great Exhibition having presented to the Society a complete collection of all the trade lists and other printed documents published by the various exhibitors, the Council have determined to carry out and extend the plan thus commenced, by inviting manufacturers, inventors, merchants, and others, to send copies of any printed bills or notices they have issued in relation to their trade, and these, of which a large number have already been received, will hereafter be arranged and bound up for reference.

The General Union of Literary, Scientific, and Mechanic's Institutions, the formation of which was announced last July, has made considerable progress during the recess, and many of the details, which so extensive and comprehensive a scheme necessarily involve, have been arranged. At the present time, and when the Union may, in fact, be said to commence, it already includes 230 of the chief provincial institutions in the United Kingdom. It is very gratifying to find how heartily the proposal of the new Union was welcomed and adopted, and the zeal and energy with which the Institutions appear willing to meet and aid the advances of the Society; it may certainly be said that the Union is established under most favourable circumstances, and if its success hereafter bears any relation to the prospects under which it is founded, its future prosperity is certain.

Since the last meeting of the Society, the Premium list has been very carefully considered and revised, in fact an entirely new one has been prepared, in which those subjects already under the superintendence of Departments of Government, or Special Societies, are made to give place to matters relating more particularly to the commerce and manufactures of the country, and our colonies.

Several important changes have been made in the office arrangements of the house, with a view to render it more convenient to the members, and also more appropriate for the transaction of business. I particularly advert to the new offices for the collector and assistant-secretary on the ground floor, the establishment of a regular post-office in the hall, for the use of the members, and the new manner in which the seats in the great room are now placed; this latter, whilst it renders ingress and egress more ready, at the same time has considerably increased the accommodation of the room for lectures and meetings.

Having now given you a rapid sketch of what has been done during the past four months, I will endeavour, in an equally brief statement, to lay before you an account of our future prospects, and those measures for the coming session which the Council propose to carry out, and in doing which they confidently reckon on the cordial aid and cooperation of the members.

The Society will have observed with satisfaction, in Her Majesty's speech at the opening of Parliament, the paragraph which alludes to the advancement of the Fine Arts and Practical Science, as a subject deserving the immediate attention of Government. It must be a source of peculiar gratification to the members of this Society, which has during the last hundred years, been striving to improve the arts and manufactures of the country, by the application of science to practice, to find how fully the national importance of such labour is recognized by the Sovereign, and that applied science will now obtain that attention from the legislature, which its great and growing importance demands.

Anxious that the forthcoming East Indian Exhibition should be so conducted as to lead to the greatest practical benefit, and conduce most fully to the development and illustration of the resources of the East, the Council have very carefully considered the best mode of carrying it out. As the close of the year is now drawing near, and as applications from exhibitors are beginning to come in, it will be necessary, very shortly, to announce to the public the arrangements which are proposed. In determining upon the kind of building which would be required, and the best locality for holding the Exhibition, the chief object of the Council was, to secure for the Indian Exhibition the greatest degree of publicity, and so to arrange that it should be most prominently brought before the manufacturing and mercantile communities and the public in general. After comparing together the various proposals submitted to them, they were led to the conclusion that the wisest course would be to unite the Indian Exhibition of 1853 with the great International Exhibition of 1853, which is arranged to be held in Dublin. The Council, for several reasons, would have preferred, in accordance with their original intention, to have held the Indian Exhibition in London, but they feel strongly the advantages which will be gained by making it part of an international one, in which Indian products and manufactures will be placed side by side with those of other countries; and they, therefore, determined to set aside all feelings and prejudices in favour of a London Exhibition, and join heartily and zealously with the promoters of the more extended Irish Exhibition. By so doing, the value, importance, and consequent beneficial influence of both Exhibitions will be enhanced.

Independently of this measure, the Council had determined to offer such aid and assistance as was in their power, to the Executive Committee of the Great Dublin Exhibition, and had accordingly placed an office in the Society's house at their disposal. Strongly convinced of the national importance of such industrial Exhibitions, the Council would let no opportunity pass, in which the assistance of the Society could with propriety be given.

In the last Session the ordinary meetings of the Society were, to a considerable extent, occupied by the series of lectures on the results of the Great Exhibition, delivered in accordance with the suggestion of our Royal President; and hence but few evenings were devoted to the consideration and discussion of subjects connected with mechanics or manufactures. The Council believe that these discussions, in which practical men take part, and compare together the results of their individual experience, are of great value; and they, therefore, propose in the present Session to appropriate several evenings to the especial consideration of particular branches of manufacture.

The working of the new Patent Law will naturally receive the careful attention of the Council. It is almost unnecessary to advert to the active part taken by many members of

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the Society in the proceedings which led to the present change in the laws relating to inventions. The views put forth by our Patent Law Committee really constitute the most important principles of the present Patent Law; and, whilst we cannot but feel that a very important change has been effected, we must, at the same time, acknowledge that it still leaves a good deal to be desired. The Society have for years advocated the necessity of a national institution, where patented inventions should be deposited and exhibited, and the value of such an establishment has been repeatedly shown by their annual exhibition of recent inventions. In the present year it is intended to hold a similar exhibition to those of former years; and inventors have been invited to send in illustrations of patents, or articles registered during the past year. It is probable that this Exhibition will neither be inferior in interest nor in utility to those which have preceded it. The Exhibition will be opened in December, and continue so for six weeks or two months, as in former years.

At the same time, a smaller and more special Exhibition is in preparation, for the purpose of showing the recent improvements, and the present state of the art of photography. Mr. Fox Talbot having lately announced his determination of relinquishing his patent rights in connection with this art, as they were found materially to fetter and retard its practical applications and improvement, a large number of persons are now taking up this very beautiful department of the fine arts, and important improvements may consequently ere long be looked for. The Council have therefore decided on opening an exhibition of specimens of Photographic art in December; and they have already received many promises of contributions both from professional artists and also from amateurs.

Many questions of commercial importance, and especially matters relating to the commerce and manufactures of our colonies, will be brought under the consideration of the Council, and of the Foreign and Colonial Committees. The various corresponding committees already alluded to, will be of great value; and the information which may be expected in reply to the circulars recently sent out to the colonies, will be of much assistance in future inquiries. Everything bearing on the culture and production of articles of commerce in the colonies, or the introduction of new departments of industry into them, will receive most careful attention; and the Council hope to have the aid and assistance of those of the members whom, from residence in the colonies, or connection with colonial trade at home, are peculiarly fitted to give practical advice upon such subjects.

Of the value and importance of the General Union of Institutions now formed, it is unnecessary to speak; the Council feels strongly the responsibility which rests on the members of the Special Committee, to whom the management of the affairs of the Union is deputed; at the same time, they have full confidence in the zeal and ability of those gentlemen. The real amount of good to be effected by this Union, will doubtless in a great measure depend on the manner in which the institutions hereafter support the Society, but much also will depend on the forethought and discrimination of those to whose care its management is confided. The Council believe that the Society will have the means of materially aiding many of the country institutions, and at the same time that the country institutions may, in turn, greatly assist the Society in the promotion of those great objects for which it was established. The affairs of the Union will therefore necessarily engage a considerable share of the Council's attention.

After very careful consideration, the Council have determined to make a considerable change in the mode of publishing the Transactions of the Society. It is evident that when the publication of the annual volume is delayed till after the close of the Session, the value of the communications which it contains is seriously diminished by the time thus lost; and this applies with peculiar force to the communications made to this Society, the value of which mainly depends on their novelty, and their immediate publication. The Council believe that the Weekly Journal of the Society of Arts, which will commence this week, will be acceptable to the Members, and at the same time also to the public at large; they trust that, under proper management, it will be of considerable value as a record of the proceedings of the Society, and as a general Magazine of useful information connected with industrial subjects. It is hoped that many of our Members will become contributors and correspondents of the new journal.

## POSTAGE ASSOCIATION.

On the 17th inst. the Deputies from the various Chambers of Commerce throughout the kingdom who were in London, in conference upon the question of the Amendment of Commercial Law, were invited to a breakfast by the Council of the Postage Association; upwards of seventy gentlemen were present, including Lord Grenville, Lord Harrowby, Lord Wrottesley, Sir John Burgoyne, K.C.B., Sir James Anderson, M.P., W.

Brown, M.P., Henry Cole, Esq., C.B., F. Crossley, Esq., M.P., C. Wentworth Dilke, Esq., Sir H. De la Beche, F.R.S., W. F. Fagan, Esq. M.P., Right Hon. T. Milner Gibson, M.P., Joseph Hume, Esq., M.P., Mr. Leone Levi, G. Moffatt, Esq., M.P., Sir R. J. Murchison, F.R.S., Captain Owen, R.E., B. Oliviera, Esq., M.P., Dr. Lyon Playfair, C.B., Antonio Setembri, Belgian Consul, M. W. Wickham, Esq., M.P., and Deputies from the following important places: Aylesbury, Birmingham, Bradford, Cork, Dover, Glasgow, Halifax, Hull, Leeds, Liverpool, Manchester, Southampton, and Worcester, &c.

The Chairman, Lord Granville, Sir John Burgoyne, and Mr. Cole informed the meeting of the proceedings of the Association, and said that the Committee had appointed corresponding members in nearly seventy of the principal towns of the kingdom: that they had opened a correspondence with nearly as many places abroad; that the most encouraging letters had been received from the representatives of every important foreign country, with only one exception; and that they were in communication with every Chamber of Commerce and commercial association in the three kingdoms, and were assured of their hearty support.

Mr. Hume, M.P., spoke warmly in favour of a Penny Colonial Postage, and said that the late Sir Robert Peel had only a day or two before he quitted office, expressed his decided opinion that the Colonies ought to be placed on the same footing with respect to postage as Jersey and Guernsey.

Lord Harrowby spoke of the great importance of the movement, and its intimate connection with the subject of commercial law—both having for their object the increasing the means of intercourse between nations. Mr. Leoni Levi followed his lordship in the same course.

Lord Wrottesly adverted to the great importance of the subject in reference to science, and said that the sending of the publications of scientific societies abroad was almost prohibited by the extravagant charges for postage. His lordship stated that the British Association had, in 1849, appointed a committee in parliamentary matters, which had petitioned the legislature for a reduction of postage.

Sir R. J. Murchison, as President of the British Association, said that he claimed the honour of having proposed this question to that body.

Mr. Brown, M.P., Deputy from Liverpool, moved the following resolution:

> "That the subject of Colonial and International Postage was one of the highest importance to the commerce and trade of the country, as well as to peace, and to the physical and intellectual improvement of mankind, and therefore demand the warm support of every Chamber of Commerce and Commercial Association throughout the country."

The motion was very ably seconded by Mr. Malcolm Ross, Vice-President of the Commercial Association of Manchester; and was adopted by acclamation.

## FOREIGN CORRESPONDENCE.

### AMERICAN INSTITUTES.

The following valuable letter from Mr. Stansbury, on the subject of the Industrial Societies of the United States, received in reply to the Circular of the Foreign Correspondence Committee, will be read with interest:

Washington, July 8, 1852.

Sir,—I have to acknowledge the receipt of your communication of the 18th of May, making certain inquiries concerning those institutions of our country which are devoted to manufactures, commerce, and the arts. It will give me great pleasure to aid the Society of Arts, so far as it may be in my power, in the noble scheme which they have devised of uniting all the industrial associations of the world in a common effort for the elevation of art, and the improvement of the artizan. Such an effort cannot fail to enlist the sympathy and co-operation of the wise and good in all countries to which your appeal may be directed.

I have no doubt that, properly brought before the industrial associations of the United States, it will meet with an universally favourable response.

These institutions are very numerous in this country. Almost every town of importance, more especially in the northern and middle States, has some institution devoted to the advancement of the mechanic arts.

A variety of names are applied to these associations; but they are all similar in organization and general character, and more or less active and useful. Most of them have small libraries, many of them reading rooms, and rooms for meetings and lectures.

The pursuits (agricultural) of our southern population, and their mode of living on large plantations remote from each other, render organised efforts for the promotion of arts and manufactures more rare among them, than in the other portions of the Union.

There is, however, an institution at Charleston, S. C., called the South Carolina Institute, which is in a flourishing condition. It made some important contributions, chiefly in the way of raw materials, to the American department of the Great Exhibition.

There are in various parts of the country many library associations, both mechanical and mercantile, whose objects are in harmony with those of your association. The most important institutions, however, of the character referred to, are the Charitable Mechanic Association of Boston, Massachusetts; the American Institute of New York; the Franklin Institute of Philadelphia, Pennsylvania; the Maryland Institute. Baltimore, Maryland; and the Smithsonian Institution, and the National Institute of this city.

Of the Boston Institution I have little knowledge, and can give you no information of value.

The American Institute of New York, is one of the oldest in the country, and is in vigorous and active existence. It has an annual exhibition, which is attended by persons from all quarters of the country.

More than 400,000 visits have been paid to one of these annual fairs. Prizes of various kinds are distributed, and are a great object of emulation among the manufacturers. The Institute also maintains a large hall for business meetings, the exhibition of models, &c., where inventors have an opportunity of bringing to the notice of the Society the fruits of their ingenuity, as soon as they are in a state to be shown, and eliciting a discussion upon their merits. This feature is found to be one of great practical importance.

The Franklin Institute of Philadelphia is also an old institution, is incorporated by the State, and is in very active existence. Its object is stated in its constitution, to be the promotion and encouragement of manufactures, and the mechanic and useful arts, by the establishment of popular lectures on the sciences connected with them; by the formation of a cabinet of models and minerals, and a library; by offering premiums on all objects deemed worthy of encouragement; by examining all new inventions submitted to them; and by such other means as they may deem expedient.

The members consist of manufacturers, mechanics, artizans, and persons friendly to the mechanic arts.

The Institution has a fine building, containing a cabinet, a library of about 5,000 volumes, and meeting-rooms, office, exhibition-room for models and works of art, &c. It also publishes a monthly journal, called the "Franklin Journal," devoted to science, and the mechanic and industrial arts, which contains a notice of all new inventions.

This Institution also holds an annual fair, and awards medals of gold and silver, as well as diplomas or certificates of merit, which are great incentives to exertion among manufacturers.

A set of working committees, consisting of the first practical men in each branch of industry, constitute the most active and efficient portion of the organization. These committees are 1st, On Science and the Arts: 2nd, On Investigations: 3rd, On the Library: 4th, On Instructions: 5th, On Publications: 6th, On Finance.

The operations of this institution are characterised by great regularity, and admirable efficiency, and it is doing much good among the class of persons for whose benefit it was established. Many of the most distinguished scientific men of our country contribute to its Journal, and are members of its committees.

The Maryland Institute is a young institution, but is fast rising into importance. It has erected in the city of Baltimore, a fine brick building, 355 by 60 feet, containing, perhaps, the largest hall in the United States. The object of the institution, as stated in its constitution, is the promotion and encouragement of manufactures, and the mechanic and useful arts. Its officers are a President, Vice-president, Corresponding and Recording Secretaries, Treasurer, and Board of Managers. Its revenues are employed in providing an annual exhibition or fair of manufacturing and mechanical industry; in the formation of a school of design, adapted to mechanical and manufacturing purposes; in the establishment of popular lectures on subjects connected with manufactures, mechanics, and the useful arts, and in the formation of a library and reading-room, a cabinet of minerals, models, and philosophical and mechanical apparatus. A school of practical and applied chemistry has been added since its establishment.

The National Institute at Washington has a department of technology, and one of fine arts, and would be happy by all means in its power to promote the objects had in view by the Society of Arts.

The Smithsonian Institution, founded at the city of Washington, by James Smithson, Esq., of England, for the "increase and diffusion of knowledge among men," has as its primary object, the promotion of original researches, and the publication of memoirs constituting actual additions to the sum of human knowledge, but it embraces as a subordinate part, in its programme of organisation, a gallery of art, whether fine art purely, or fine art in its application to the useful arts.

It proposes to procure for the gallery, casts of the most celebrated works of ancient and modern sculpture; to furnish a room free of expense for the exhibition of the objects of the Art Union, and other similar societies, and to make an annual appropriation for models of antiquities, such as those of ancient temples, &c. It is also within the province of the institution to publish reports from collaborators of known ability, on agriculture, on the application of science to arts, and on the fine arts, and their application to the useful arts. This institution, on account of its large pecuniary means, and the distinguished reputation of its officers, is one of the most powerful and influential in the country.

The above mentioned are the principal institutions of the kind referred to in your first question. They are all (with the exception of the Smithsonian Institution) supported by the subscriptions of their members, the entrance fees to their exhibitions, and other sources of revenue, wholly private. None of them have any connection with the Federal Government, except the National Institute, which is incorporated by it, and of which the President of the United States is *ex-officio* patron, and the members of the Cabinet, *ex-officio* directors. The Federal Government also holds the reversion of all the property of the National Institute, in case of its dissolution. The Smithsonian Institution derives its support from the interest of the sum (100,000*l.*) left by its founder, in trust to the Government of the United States.

There is nothing noticeably peculiar in the organisation of these institutions. They have the usual corps of officers common in such cases.

The Executive Officer of the Smithsonian Institution is the Secretary, and of the Franklin Institute is the Actuary of the Board of Managers.

The officers with whom correspondence is held on the business of the institutions, so far as I am acquainted with them, are as follows:

American Institute; Adoniram Chandler, Esq., Corresponding Secretary, New York, New York.

Franklin Institute; William Hamilton, Esq., Actuary, Philadelphia, Pennsylvania.

Maryland Institute; William Prescott Smith, Esq., Corresponding Secretary, Baltimore, Maryland.

Smithsonian Institution, Joseph Henry, LL.D., Secretary, Washington City.

National Institute. J. C. G. Kennedy, Esq., Washington City.

Any or all of the above institutions could with good prospect of advantage to itself, and to the Society of Arts, enter into the proposed association.

The sixth question has been already answered. The Franklin Institute, and the Smithsonian Institution, are the only ones that publish extensively. The others publish the annual reports of their officers, catalogues of their exhibitions, annual addresses, &c.

The Smithsonian publications are in imperial quarto form, and are creditable specimens of book-making, as regards paper and typography. The Franklin journal is an octavo.

Your last question requires an opinion as to the great design the Society have in view, and the obstacles it will be likely to encounter.

It seems to me there can be but one opinion as to the tendency of so liberal a scheme carried out in the spirit in which it has been conceived. The human family is an unit, and no political divisions ought to be permitted to rob it of the advantages which practical unity must bestow. All ingenuity employed in discovering what is already known, all time wasted in experiments which have already been tried, is so much subtracted from the sum of human progress.

Your plan substitutes for isolated and ignorant efforts, intelligent and united action, and must, if it meet with general adoption, result in the immense and rapid advancement of the industrial arts. I have watched with interest and pleasure the fruits of the Great Exhibition, as they have been gradually but steadily unfolding themselves under the fostering care of your Society. The new movement in art education; the classification of trades with a view to study their condition and wants; the simultaneous collection of information from all quarters, and its collation by committees of scientific men, versed in the various departments of industrial art; and last of all, the effort to unite all civilized nations in the great and good work in which you are engaged,—all show that England is resolved that the lessons she laid before the world in the extraordinary and magnificent spectacle of 1851, shall not be forgotten or neglected; that every line of that great industrial monument shall be carefully traced and faithfully transmitted. In this noble effort, you ought to receive the "God speed" of all enlightened nations.

It is difficult to anticipate the obstacles you may have to encounter in the prosecution of the plan. Ignorance, indifference, prejudice and jealousy, are too apt to start up and oppose any great and beneficent undertaking, to allow us to anticipate universal and cordial co-operation. I know of no peculiar difficulty in its way with regard to the institutions of our own country. Show them that in asking their aid, you are actuated by an unselfish desire to advance for the benefit of all mankind, the same cause in which they are labouring, and I have little doubt that they will generally and heartily throw themselves into the work.

In conclusion, allow me to thank you for the offer of aid in "researches in subjects connected with arts, manufactures, and commerce." I am now engaged in drawing up a report on the Exhibition for our Government, and should be greatly obliged by such publications of the Society as may assist me in this work. I should also be glad to receive the proceedings of the Society, and to be kept informed of the progress of the plan it is now engaged in carrying out. In return I shall be happy to place myself at the command of the Society in every way in my power, and to forward to it all documents, having connection with its objects, which are published by our Government.

I have the honour to be, Sir,
Your most obedient Servant,
CHAS. F. STANSBURY.

To the Secretary of the Society of Arts,
John-street, Adelphi, London.

## COLONIAL CORRESPONDENCE.

THE replies received through the Colonial department of Her Majesty's Government, to the Circulars sent out in the Spring, contain many valuable suggestions connected with the productions and commerce of the Colonies. Want of space prevents more than the insertion of the following dispatch from Governor Barkly; the accompanying letter from Berbice, is necessarily postponed.

### BRITISH GUIANA.

Government House, 10th July, 1852.

SIR,—With reference to your Circular Despatch of 24th April, transmitting at the request of the Council of the Society of Arts, a copy of a letter from their Secretary, representing the advantages of a more general diffusion of the objects of their Society throughout the Colonial Empire, and stating that you should be glad to learn that these views had been adopted in this Colony, so far as to lead to the formation of an Association for the purpose of entering into correspondence with the Parent Society,—I have the honour to state, that as it appeared to me that the proper local organization for the promotion of such objects already existed here, in the "Royal Agricultural and Commercial Society" in this city, and a Society of a kindred nature, though with a humbler title, in New Amsterdam, called the "Berbice Reading Society,"—I thought it best to address myself to their respective Secretaries, with a view of inviting that co-operation, which they had previously given me in collecting specimens for the Great Exhibition of 1851.

I have now the pleasure to forward communications from both these Institutions, showing that the Members enter warmly into the views of the Society of Arts, and have appointed Committees to correspond with the Colonial Committee of that Society, on all subjects of interest and importance.

From the very general attention which has lately been directed to the development of the great natural resources of this Colony, I have every confidence that such a correspondence will lead to results of great practical utility, among the first of which I may rank the preparation of considerable quantities of Textile Fibre from the Stalk of the Plantain, the great article of food among the labouring population of the Colony; and it will be perceived from the Minutes of the Agricultural Society, that they are most anxious to procure that variety of the plant which produces the "Manilla Hemp" of commerce, which is supposed to be of superior strength to the fibre of the common "Musa."

I have written to Sir William Hooker on the subject, and trust that with the aid of the Society of Arts, seeds or suckers may be imported from the Philippines into the British tropical possessions.

I have, &c.,
(Signed) Henry Barkly.
The Right Hon. Sir John S. Pakington, Bart.

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Royal Agricultural and Commercial Society of British Guiana, Georgetown, 11th June, 1852.

Sir,—I have the honour to acknowledge the receipt of your letter of the 28th ultimo, No. 385, transmitting, by command of his Excellency the Governor, a copy of a Circular despatch from the Right Honourable the Secretary of State for the Colonies, together with its inclosures, on the subject of the advantages which would probably accrue to this colony from the successful prosecution of the objects of the Society of Arts in London, set forth in the letter of their Secretary to the Secretary of State, under date the 26th March.

These documents were laid before a Meeting of the Board of Directors of this Society held yesterday, at which the importance of the objects mentioned in the communication from the Society of Arts was fully recognised; and it was resolved that a General Meeting of this Society should be immediately convened, to determine what steps should be taken so as best to meet the views of the Society of Arts, and to enable this colony to participate in the advantages which are likely to arise from a correspondence with the Colonial Committee of that body.

The Meeting further instructed me to request you to assure his Excellency the Governor, that the zealous co-operation of the Directors of this Society, in the promotion of the objects referred to, may be confidently relied on; and that the Directors are much gratified that this Society has been selected by his Excellency as the medium for carrying into effect in this colony the views of the Society of Arts.

It was further suggested at the Meeting, that as much attention has lately been directed to the capability of this colony for producing and exporting various fibres of great commercial value, and that as the Manilla fibre, of which so large a quantity is now imported into England, is produced by a species of plantain or banana (*Musa textilis*) indigenous in the Philippine Islands, but not yet introduced into this colony, it would be very important if the Committee of the Society of Arts would adopt means for procuring seeds or suckers of this plant, to be sent to this and other colonies, where there is a probability that the climate and soil would be well adapted fo for its growth and cultivation.

I have the honour, &c.,
(Signed) W. H. Campbell, Secretary.
The Honourable William Walker,
Government Secretary.

Minute.—At a meeting of the Royal Agricultural and Commercial Society of British Guiana, held on the 1st of July, it was unanimously resolved that steps should be taken, to enable the Society to avail itself of the opportunity thus offered for placing itself in communication with the Society of Arts, for the purpose of developing the resources of the Colony, and participating in those advantages which will unquestionably be derived from a correspondence with the distinguished and scientific men who constitute the Colonial Committee of that Society.

On the motion of Mr. John Gordon, it was unanimously resolved:—That the following Members of this Society be appointed a Committee to correspond with the Colonial Committee of the Society of Arts, and that they be directed to request the assistance of, and add to the Committee, such other persons as they may consider likely to co-operate with them:

A. Macrae, Esq.
D. Macdonald, Esq.
The Hon. A. D. V. Gon Netscher.
J. Gordon, Esq.
John Shier, Esq., LL.D.
J. E. Roney, Esq.
W. Knight, Esq.
J. S. Stutchbury, Esq.
James Donald, Esq.
F. A. R. Winter, Esq.
W. H. Campbell, Esq.

It was further resolved:—That the above-mentioned Committee be empowered to frame such Rules as they may consider necessary to enable them to carry out, in an efficient manner, the objects of their appointment; and that the Society will aid them with funds to such extent as it may be in their power to do.

The Meeting directed these proceedings to be published for general information, in the hope that all Colonists, who have opportunities of doing so, will cordially co-operate with the Committee above appointed, and forward through them such Communications and specimens of the Productions of the Colony, as they may wish to have transmitted to the Society of Arts.

W. H. Campbell, Secretary.

## PARLIAMENTARY REPORTS.

The following Form of Petition to both Houses of Parliament for copies of some of their Reports has been very widely distributed during the past week. It is hoped that by a united effort this much and long-desired object may be attained. It is desirable that all the petitions should be presented at, or about, the same time. A little before Christmas has been suggested as the best time. The petitions should be *written out*, and signed as numerously as possible; one signature, at least, being on the same page as the words of the petition itself:

Sheweth;

That your Petitioners are Members of a Society established at under the title of which has a Library and Reading-room that are much frequented:

That your Petitioners are strongly impressed with the value of the Reports which are published from time to time by order of your [Right] Honourable House:

That, in the opinion of your Petitioners, the distribution of many of those Reports among the different Institutions throughout the country established by voluntary association for the cultivation of Literature, Science, and Art, and the diffusion of useful knowledge, would be attended with very great public advantage:

That information of the highest importance to the industrial interests of the country would thus be widely disseminated, and the deliberations of Parliament upon measures affecting those interests thereby materially aided.

Your Petitioners therefore humbly pray that your [Right] Honourable House will cause inquiry to be made whether the Reports of your [Right] Honourable House, especially those relating to Arts, Manufactures, and Commerce, might not, under proper regulations, and at a comparatively small cost, be distributed to such bodies as that of which your Petitioners are members.

And your Petitioners will ever pray.

## UNION CORRESPONDENCE.

### JOURNAL AND LECTURES.

———, Mechanics' Institution.

SIR,—Having consulted our Committee as to the two subjects which head this note, I am now in a condition to give the following reply.

Our Institution would agree to take a copy of the Journal, and would be happy to supply information, &c., on local subjects. Might not a portion of the Journal (if established) contain a List of Books, &c., which might be wanted in some Institution, and be in duplicate in others?

All correspondence should be docked of complimentary verbiage, and, unless in very peculiar cases, merely the substance of letters should be given; and if any one sent information with a letter it should be merely stated, the following is from A. B., without encumbering the Journal with the letter as is too frequently done. These are small matters, but will be found of some moment, when from three to four hundred Institutions are to take an acting part in contributing to the Journal.

On more important matters, of course I do not venture to speak, as the leading communications must be necessarily stamped with the characteristics of the individual contributors.

In returning the "Subjects for Lectures," I have only to remark that the additions are merely intended as "hints for subjects," some of which have been, and others of which might be profitably handled. Of course it would, with longer time to consider, have been profitable to add a number of other heads of possible lectures.

One of the great difficulties is to obtain well qualified "Class Lecturers." General Lectures are very well to stimulate, but it is only "Class Lectures" which can really teach anything in a satisfactory way. But this is a point which can only be satisfactorily dealt with after some experience of the working of the New Union.

The circulars relative to Museums and Local Exhibitions are under the consideration of the Committee, and will be replied to in a week or ten days.

I am, Sir, your obedient servant,
J. M. G.

### LECTURES.

——— Mechanics' Institution,
Sept. 10th, 1852.

SIR,—"Good and cheap lecturers are wanted," but where are they? If good, they want more money than the Institutions can afford to pay—if cheap, or more properly speaking low-priced, they are a risk and an evil. But how are Institutions to pay high rates?—they cannot do it unless by combining together in engagements for lecturers, and that is difficult to do, as they cannot readily agree about their open nights. I am afraid to ask the terms of the lecturers you mention, I believe they are high—higher even than our Institution, which is comparatively wealthy, can afford to pay. And yet we cannot get gifted men for nought. We allow our members free admittance to Lectures, with the right to introduce each a lady—our receipts from strangers are often *nil*. How then, with any regard for keeping free from debt, are we to secure talented men? The highest sum that we seem justified in paying is five guineas per lecture, and even then, only when talent is of first-rate order. I know this is too low for highly educated men; but it is higher than we are justified in paying, unless the public evince a relish and anxiety for good lectures. Suppose some great name, offering eight or ten lectures at ten guineas per lecture — here is a serious responsibility indeed for a Board of Directors, having the funds of others to dispose of, to take upon themselves; but then we require perhaps fifty lectures in a session!

Lecturing has done little for education; it has tried to *get too high; it has too often forgotten that our young people daily rising up want the introductory, though our adult members require the latest discoveries and the deepest philosophy*;—to combine these is necessary for popular Institutions, constituted, as these are and must be, for some time to come. The lecturer, too often soaring to the height of his longest range, gets beyond the reach of the mental vision of a popular and half youthful audience, and then science is dry and unattractive, and fails to pay. The result is, less important matter is more attractive, and Institutions are silently led, like other people, to supply that which is most in demand, even until cheapness and bad material banish the whole business from the market. It is thus, at this time, with the lecture market.

We want able men, men who can afford to *talk plainly* of great things, who can come *down* to the people so as to take hold of them and *raise* them up, who can be familiar and who care more for making their audiences *understand* than for dazzling them with their own profound reveries. And we want men who can so combine science with the business of life, that whilst showing that it is profitable, can also make it win upon the affections and minds of men for its own intrinsic good.

I fear I am dwelling too much upon this subject, but if we can only understand what all managers of Institutions find wanting, we may at last think the right thing out for supplying our wants.

I will not enter into any details, as they are scarcely necessary at present. I shall try to think over how these things can be improved, and perhaps lay before you the detail of lecture costs, &c. as they run through a session, so that your present active exertions may be in some measure aided by a knowledge of what is doing and how it is accomplished.

I am, yours truly,
H. S.

E. Solly, Esq.

## REPORTS OF INSTITUTIONS.

### PATRICROFT MECHANICS' INSTITUTION.

The Seventh Annual General Meeting of the above Institution was held on Monday Evening last, the 11th instant; James Nasmyth, Esq., in the Chair, when the following Report of the retiring Committee was read by the Secretary:

"Your Committee, in presenting their present Report, regret that they are still compelled to refer with pain to the indifference manifested by the public to the advantages resulting from a connection with the Institution. For whilst the population of the neighbourhood has increased considerably within the last few years, the number of members in connection with the Institution is less than at any former period.

"Your Committee are at a loss to account for this on any other grounds than that of a want of sympathy on the part of the masses with any thing of any intellectual character.

"It is for the present meeting to consider what measures, if any, can be adopted to infuse new life and vitality into the Institute, in order to render it, what it ought to be, a blessing to the neighbourhood. During the past year about seventy volumes of books on various subjects have been added to the library, which now consists of about 840 volumes. The Committee find, on reference to the Librarian's books, that about 1,300 volumes have been taken out of the library by the members. This is encouraging; let us hope that the books have not been circulated in vain. The News-room continues to be tolerably well frequented, and being well supplied with newspapers and other periodicals, the Committee have little fear of its losing its popularity. During the past year the Institution has been joined to the Union of Literary, Scientific, and Mechanics' Institution, of which the London Society of Arts is at the head; from which connection they hope to obtain a portion of books, and the services of Lecturers, eminent in their several professions, on more advantageous terms than they would otherwise be able to do.

"The finances of the Institution are satisfactory to some extent; owing to the visit of Her most Gracious Majesty to this neighbourhood, Messrs. J. Nasmyth, and Co., having kindly allowed the use of their foundry-yard for the accommodation of visitors, and presented one-third of the proceeds to this Institution, being a sum of 16*l.* 13*s.* 4*d.*, the other two-thirds having been given to other charitable purposes in the village."

The Treasurer's Report was next read, and adopted by the meeting; after which the election of officers for the ensuing year took place, the names of the gentlemen are as follows:

Sir B. Haywood, Bart.—*Patron.*

Messrs. James Nasmyth.—*President.*

Messrs. Henry Leigh, John Booth, Rev. T. E. Poynting, Henry Whitworth, Thomas Wilson, F. Spencer, John Hepworth, *Vice-Presidents.*

John Booth was also appointed to hold again the office of *Treasurer.*

James Hodgkinson, Henry Leigh, *Auditors.*

John Johnson Farthing.—*Hon. Secretary.*

Messrs. T. S. Rowlandson, J. Ditchfield, T. M Crewdson, John Capper, Charles Mather, Robert Willis, S. Daniel, Thomas M'Walley, Daniel Fielding, John Leigh, J. Hilton, Thomas Holker, *Committee.*

After the elections were concluded, and the ordinary routine of business had been transacted, a vote of thanks was accorded to James Chadwick, Esq., of Eccles, the proprietors of the *Manchester Guardian*, and others, for a gratuitous supply of newspapers for the reading-room.

The Chairman having vacated his seat, Mr. Selim Rothwell was appointed Chairman, when it was resolved, on the motion of Mr. H. Leigh, seconded by T. Crewson, that the hearty thanks of the meeting be presented to James Nasmyth, for his able conduct in the Chair.

The meeting then separated.

John J. Farthing, *Hon. Sec.*

## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Institution of Civil Engineers, Nov. 23rd J. M. Rendel, Esq., President, in the Chair.—The paper read, was "On the Drainage of Towns," by M. Robert Rawlison, Assoc. Inst. C. E. The Author, restricted his remarks to a few general points, likely to induce discussion and to elicit criticism, on former and present systems. Politically, the question of sewerage was very urgent, as the general health of the population influenced, to an important extent, the amount of misery, pauperism, vice, and crime existing in every city. In 1841, the population of one hundred and seventeen districts, comprising the chief towns, was 6,612,958 souls. In 1851, in the same districts, the number was 7,795,958. Disease had been rife in those districts, but it was shown, that much of it might have been averted by timely sanitary precautions. The questions of forms, dimensions, fall, cost, &c., of large and small sewers were passed over, with the remark that they were matters of detail, to be fixed by the knowledge and experience of the Engineer; contending however that the system most deserving commendation was that which enabled the greatest extent of sewerage to be well and cheaply accomplished. The position of the outlet would be governed by natural local conditions; and the dimensions would be fixed by the area and the number of houses to be drained. The material of construction, was a question dependent entirely on experience and practice; earthenware pipes were, however, according to the Author's views, the most economical and effective for all sewers and drains, within the capacity of the material. It was contended, that town sewers could not receive the excessive flood waters, even of the urban portion of the site; they should never receive the suburban drainage, nor be combined with water-courses; they should be adapted solely to remove the solid and liquid refuse from the houses; and that it was safer for the inhabitants that there should be no sewers at all, rather than they should be of such dimensions as to become places of deposit. Pumping could be profitably adopted in certain situations, where from the level, or the effect of tidal influence, the outlet flow might be checked. Intercepting sewers at mid-level were approved. Sewers of minimum dimensions were advocated, in connection with pumping, and they should be capable of resisting internal hydraulic pressure, in case of the water rising in them. The flow through sewers should be constant, and it was argued, this could only be secured by having small conduits. The extraordinary fall of rain, at Birmingham, in July, 1845, when nearly 2 inches of rain fell in half an hour, equivalent to 9·091 gallons per square yard, or 44,000 gallons per acre, was used as an argument against the building of large sewers, below the level of the cellars, which, to be of service, must be capable of carrying off the heaviest rain-fall. With regard to earthenware pipes, 3 inches diameter was considered too small, for any drain pipes, and 30 inches diameter, too large, for the material of which they were made. Pipes of 4 inches diameter would probably be found the least sectional area, that should be used for house drains, and 9 inches for streets, and then not at a less gradient than one in sixty. The general success of the use of egg-shaped pipe sewers, at Manchester, was given as an example of the advantageous employment of the pipe system. The various kinds of joints were described, and it was recommended not to use pipes of larger diameter than about 15 inches, as larger sizes were apt to be fractured, from unequal bearing at the joints. Sewers of radiated bricks, moulded for the purpose, were better and cheaper than large earthen pipes; a sewer thus constructed, 3 feet in diameter, being cheaper than one of pottery pipe of 20 inches diameter; their relative capacities being as the squares of their diameters, and there was no reason why brick sewers should not be as smooth within and as impervious as any pottery pipe. The true purpose of Town Sewerage must be considered, as the removal, with the utmost rapidity, from the vicinity of dwelling-houses, and the sites of cities and towns, all the refuse, which being liable to decomposition, could be conveyed away in water; and the more perfectly this could be accomplished, the better would be the work, and the greater the credit due to the Engineer.

## PROCEEDINGS OF INSTITUTIONS.

**Bristol.**—At the People's Institution, the opening Lecture of the Session of 1852-53, was delivered by Mr. W. Harwood, on "The Railway System." The Lecturer considered the subject under three heads, Engineering, Mechanical, and Statistical; and gave a brief history of the origin of the system in the old way-leaves of collieries. The subject is to be resumed, when the Lecturer will refer to the influence of Railways upon national education and industry.

**Dublin.**—Dr. M'Elheran recently gave an interesting and humorous Lecture at the Mechanics' Institute, on Ethnology, contrasting especially the peculiar differences in the mental and physical developements of the Saxon and Celtic races. He showed that degeneracy was due to three causes,—slavery, ignorance, and starvation; and brought forward arguments to prove the unity of the human race. After alluding to the transcendental doctrine of developement to the distinctive attributes of long and short-headed men, Dr. M'Elheran gave an original view of what, in his opinion, constitutes beauty; illustrating his arguments by several well-executed diagrams.

**Edinburgh.**—Professor Balfour is at present giving a course of Lectures on the Structure and Function of Plants, at the Philosophical Institution. In his second Lecture he explained the nutrition and reproduction of plants, and afterwards to the organic and inorganic substances which go to build up their structures, and which are afterwards employed for the sustenance of animal life.

**Knaresborough.**—The annual *soirée* of the Literary Institution was held under the presidency of Andrew Lawson, Esq., of Aldborough. The entertainments were of the usual character. The rooms were decorated with flowers and paintings, for the occasion, and an amateur brass band contributed much to the enjoyment of those present.

**Leeds.**—The Right Hon. Lord John Russell, M.P., has kindly consented to preside at the annual *soirée* of the Mechanics' Institution, to be held in the Music Hall, on the 8th of December.

**Redditch.**—The winter season of the essay-class of the Literary and Scientific Institute was commenced by the reading of a paper by Mr. W. Avery, descriptive of his travels through Spain. The manners, habits, and customs of the Spanish people were graphically pourtrayed, illustrated by many anecdotes, tales of miracles, &c., including, of course, the national pastime of bull-fighting.

**Shelton.**—The members and friends of the Potteries Mechanics' Institution, held a *soirée* in the Assemby-room of the Town-hall, Hanley, for the purpose of raising funds for the erection of a new building in the Palladian style, to contain news, committee, class-rooms, library, museum, and lecture-hall. In the early part of the evening a concert was given, and was succeeded by a ball.

**Walsall.**—The Rev. J. H. Sharwood, M.A., the Vicar, recently delivered a Lecture to the members of the Philosophic Institution, on the British Colonies. The Lecture comprised a detailed account of the gradual increase of our colonial possessions, America, the East and West Indian territories, Borneo, New Zealand, and lastly, our Australian possessions, and the discovery of gold in that country. It thus took in the whole circle of the globe, exhibiting the vast extent and importance of our territories and dependencies, and the magnitude of the trust devolving on England, in connection with their welfare.

**York Institute.**—Mr. H. Plint, of Leeds, delivered a lecture on "The Writings of Oliver Goldsmith." The lecturer commenced by giving a short sketch of Goldsmith's life, early literary pursuits, and acquaintances. He then read extracts from several of the published works, and said that as a poet, without possessing the sublimity of Milton, or the versatility of Byron or Shelley, Goldsmith had obtained an immortal fame. A perusal of these writings, which though often sarcastic, were always moral and abounded with beauties, would be far more beneficial than many of the publications of the present day. The treasurer announced that a legacy of nineteen guineas had been received from the executors of the late William Smith, Esq., of Mount-terrace, York.

## PATENT LAW AMENDMENT ACT, 1852.

The Law-officers of the Crown have issued their Rules and Regulations under this Act to be observed by applicants for Patents for Inventions, together with a Table of Fees. These Rules provide that all specifications and other documents to be deposited and filed at the Commissioners'-office (which for the purposes of the Act is declared to be the Great Seal Patent-office), shall be on paper or parchment of certain uniform size, so as to be kept bound up in books in the office; a vast improvement upon the old system of enrolment. No warrant for sealing Letters Patent to be granted which contains two or more substantive Inventions. Every provisional protection allowed, and every protection obtained by deposit of a complete specification, is to be advertised in the "London Gazette." Notices of intention to proceed are also to be advertised in the "Gazette," and opposing parties are at liberty to lodge particulars of their opposition at the Commissioners'-office, within Twenty-one days from the date of such notice. Provision to be inserted in all Letters Patent, in respect of which provisional specification shall be left on application for the same requiring specification to be filed within Six Months from date of application.

It cannot fail to be a matter of congratulation to the members of the Society, that the labours of their Committee for the improvements of the Patent Laws have met with such signal success; the greater part of the principles advocated by that Committee having been adopted by the Legislature.

It is hoped that the Commissioners will lose no time in preparing for public use (as they are directed by the Act) a complete Index of all past Patents.

### APPLICATIONS AND PROTECTION ALLOWED.

*Gazette*, 19*th Nov.*

*Dated* 15*th Oct.*, 1852.

408. W. J. Matthias and T. Bailey—Clocks and watches.

*Dated* 23*rd Oct.*, 1852.

409. J. Brodie—Shipbuilding.
510. J. Tayler—Weaving.

*Dated* 25*th Oct.*, 1852.

513. S. Plimsoll—Fining beer and malt-liquors.'

*Dated* 3*rd Nov.*, 1852.

622. G. W. Ley—Material in lieu of wood, leather, mill-board, or oilcloth.
624. E. Lord—Spinning and weaving.
6 5. J. Cameron—Steam-boilers and feed-pumps.
626. C. Phillips—Reaping-machine.
627. A. A. de R. Hely—Shades and chimneys for lamps.
628. A. Sidebottom—Machinery for cutting books, &c.
629. A. A. Tiesset—Apparatus for exhibiting notices, advertisements, &c.
630. H. Spencer—Steam-engines and boilers.
631. H. Blair—Supply of water to steam-boilers.
632. N. Hodge—Discharging water from ships.
633. J. Macintosh—Projectiles and cartridges.

*Dated* 4*th Nov.*, 1852.

634. E. Petit—Musical instrument "Euphotine."
635. C. Pryse and R. Redman—Firearms.
636. E. T. Archer—Coverings for walls.
637. W. Pope—Ventilation of ships.
638. A. Brackenbury—Muriate of Soda.
639. J. Reynaud—Imitation of Marbles and coloured woods.

*Dated* 5*th Nov.*, 1852.

641. C. Hall—Carriage of manure.
642. J. Pilbrow—Motive power.
643. J. Bunnett—Revolving metal shutters.
644. G. Shand—Products from tar.
645. P. Fairbairn—Reeling machinery.
646. G. Fife—Steam and water-gauges.
647. J. H. Porter—Portable buildings.
648. J. Frame—Looms and weaving.
649. J. L. Knox—Ornamental Fabrics.
650. J. Wotherspoon—Manufacture of confectionary and apparatus.
651. H. Hughes and W. T. Denham—Machinery for ribbons, trimmings, &c.
652. J. H. Young—Weaving.
653. C. Hampton—Pianofortes.
654. R. Wright—Shafts and plummer-blocks.
655. R. B. Cousens—Cutting cork.
656. Earl Dundonald—Bituminous substances.

*Dated* 6*th Nov.*, 1852.

657. J. Melville—Combination of iron and wood for building.
658. J. R. and J. B. Corry—Sewing gloves.
659. J. E. and C. Gosnell—Brushes.
660. J. Nichol—Graining and ornamenting.
661. J. B. Frith—Apparatus for dressing, &c., velvets, velveteens, &c.
662. P. Fairburn and J. Hargrave—Machinery for opening, combing, and drawing wool, flax, &c.
663. J. V. Augier—Gas and apparatus.
664. J. A. Phillips—Purifying tin.
665. J. H. Chandler—Hoes.
666. B. Baillie—Drawing and registering fluids.
667. W. F. De la Rue—Writing-cases.
668. C. F. Day—Sleepers and permanent way.
669. J. Morel—Figure-weaving.

*Dated* 8*th Nov.*, 1852.

670. C. Troupeau—Diurnal reflector.
671. G. J. Walker—Gigs and carriages.
672. S. Carey—Viaducts, arches, &c.
673. J. Brodie—Propulsion of ships.
674. P. Fairburn—Screw gill machinery.
675. J. S. Crowley—Signals and switches.
676. W. E. Newton—Carbonate of soda.
677. A. Robeson—Bucking cloth.
678. R. J. Longbottom—Preventing vibration in railway and other carriages and axles.
679. S. Hoga—Ascertaining existence of gold in earth.

*Dated* 9*th Nov.*, 1852.

681. J. A. Heathcote—Siphons and pipes.
682. M. Newton—Carriages, and prevention of upsetting.
683. J. J. Ziegler—Preparation of cotton, &c., for spinning.
685. R. Knowles—Steamboilers.
686. N. M'Carthy—Boots and shoes.
687. A. Waterhouse—Filtering-pot.
688. G. S. Ogilvie—Candlesticks and lamps.
689. T. Bevis—Drilling and dibbling machinery.
690. J. C. Booth—Chromate of potash.
691. W. Gossage—Sulphur.
692. W. E. Newton—Axles and axletrees.
693. W. T. Mabley—Ornamenting glass.
694. C. Griffin—Fixing type in chase.
695. R. B. Evans—Charcoal.
696. J. D. Gordon—Tuning pianofortes.
697. O. Hussey—Reaping-machines.
698. O. D. Healy—Getting coals and minerals.

*Dated* 10*th Nov.*, 1852.

699. C. Fox—Extracting oil from fatty matters.
701. J. G. Guinness—Heating air.
703. A. Baboneau—Melting and mixing asphalte, and bitumen, and other substances.

### APPLICATIONS, WITH COMPLETE SPECIFICATIONS DEPOSITED.

707. R. Prosser—Metal tubes, 11th Nov.
708. R. Prosser—Rolling of Metals, 11th Nov.
716. R. Barnes—Cocks and plugs.
732. R. J. Smith—Steering ships.

*From Gazette*, 23*rd Nov.*, 1852.

NO APPLICATIONS.

## WEEKLY LIST OF PATENTS SEALED.

None.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Nov. 17 | 3390 | Cricket Guard | William Redgrave | 24, Grafton-st., Fitzroy-sq. |
| ,, 22 | 3391 | Annealing Pot | James Horsfall | Birmingham. |
| ,, 24 | 3392 | Improved Self-acting Service Cistern for Water-Closets | | |

# SOCIETY OF ARTS.

**FRIDAY, DECEMBER 3rd, 1852.**

## SECOND ORDINARY MEETING,

*Wednesday, December 1st,* 1852.

The second ordinary meeting of the Society was held on Wednesday, the 1st instant. The chair was taken by W. Tooke, Esq., F.R.S., and subsequently by Lord Monteagle. The following Gentlemen were elected members:

Bolton, Thomas, 17, Hamilton-street, Camden-town.
Chambers, George, High Green House, near Sheffield.
Crowfoot, W. J., M.D., Beccles.
Edgeworth, T., Wrexham.
Gorham, John, Tunbridge.
Grove, George, 3, Adelaide-place, London-bridge.
Haden, George, C.E., Trowbridge.
Harvey, William, Barnsley.
Haworth, Rev. Richard, M.A., Huntingdon.
Heane, Henry, Newport (Salop).
Heathcote, John, M.P., Tiverton, and 5, Warwick-street, Charing-cross.
Hopkinson, W. L., M.D., Stamford.
Hunt, Robert, Museum of Economic Geology, Jermyn-street.
Litchfield, John, Northampton.
Lloyd, Sampson, Wednesbury.
Macready, William Charles, Sherborne, Dorset.
Martin, Horace, Battle.
Morgan, Henry, The Terrace, Sheerness.
Pearce, Alfred B., 23, Ludgate-hill.
Petit, Rev. J. L., 9, New-square, Lincoln's-inn.
Portman, Lord, Bryanstone, Blandford, Dorset.
Russell, Lord Charles, Woburn.
Smart, George, Cardiff.
Tancred, John William, Greenwich Hospital.
Trevelyan, Arthur, Wallington, Morpeth.
Vane, Rev. J., Barrington, Bristol, and 29, Cambridge-street, Hyde-park.
Walters, Rev. Charles, M.A., F.R.A.S., Winchester.
Wicksteed, Rev. Charles, Leeds.
Wright, Caleb, Tyldesley.
Wrightson, William Battie, M.P., Cusworth, Yorks., and 22, Upper Brook-street,

and the names of one hundred and nine candidates for membership were read.

Mr. Cole then gave his Lecture on the International Results of the Great Exhibition of 1851. As this lecture will be immediately published entire, as the concluding one of the series given before the Society, it is unnecessary to give so full an abstract of it, as would be otherwise desirable, with so important and interesting a subject.

The lecture commenced by a brief review of some of those circumstances which led to the Great Exhibition, and the peculiar reasons which rendered the year 1851 a most appropriate period for holding a great international Exhibition, and which at the same time combined to make England the best and fitted locality for such a comparison of industrial progress.

The first suggestion of a great international Exhibition unquestionably came from France; but from the manner in which the proposal was met, when it was first put forth by M. Buffet in 1848, it was evident that the French manufacturers, though quite alive to the importance of such an Exhibition, from their long experience of the results of their own national Exhibitions, were not at all inclined to adopt the idea of a universal comparison of industry. They were willing to accept all the advantages which such an Exhibition might offer to them, but they were afraid of the foreign rivalry and competition to which it would most certainly expose them. The proposal of M. Buffet, therefore, was not carried out; it was an offer to other nations to come and show to the French manufacturers what they were doing, but upon the understanding that they were not to gain anything by such an Exhibition!

Mr. Cole then showed how the cosmopolitan nature of the English nation eminently fitted it to carry out this great idea in its fullest and most complete sense. After a short account of the steps in the first instance taken by the Royal Commission, Mr. Cole proceeded to point out the important international principle which was recognised and adopted in the formation of the "Juries," in which, for the first time, international questions relating to art, science, and commerce, were discussed by men practically acquainted with such subjects. From the further development of this great principle, it might possibly hereafter arrive, that other and more important international questions,—even those upon the issue of which peace or warfare might depend,—should be settled by the voices of merchants and manufacturers, rather than by the correspondence of diplomats, or the thunder of artillery Success in war depends on the length of the national purse, and the national purse depends wholly upon national industry.

Amongst the more immediate results of the Great Exhibition must be mentioned, that agitation in favour of a reduced and uniform system of postage, which, sooner or later will surely lead to an improvement in the mode by which international and colonial correspondence is conducted. The reform of our Patent Laws also, to some extent, may likewise be traced to the Great Exhibition; and though this is at present, in truth, only a national result, yet if the new law is really and truly carried out, and if the specifications of all our patents are printed, as is the case in America and Belgium, it will soon become an international one.

The Sanitary Congress instituted at Paris, is another development of the international spirit, brought about by the Exhibition, and will probably in time lead to the future reformation of the Quarantine Laws, and to the arrangement of many other medical questions of importance.

Improved modes of conveyance, by land and by water, have led to increased travelling, and the large number of manufacturers and artizans who have been enabled, in consequence, to visit other countries, both giving and receiving information, whilst it cannot fail to benefit all classes of manufacturers, will also lead to yet further improvements in the means of locomotion.

Certainly not least in importance amongst the results of the Exhibition, is the introduction of a new and most useful kind of architecture in glass and iron, as shown in Paxton's building; it is hardly possible to overrate the beneficial influence which the Crystal Palace is calculated to produce on the occupations, health, and amusements of all northern nations.

As regarded the rapid progress of science abroad, and the alleged deficiency of Englishmen in taste and true knowledge of the Fine Arts, Mr. Cole observed that, "whilst he did not fear the results of the first, so he doubted the truth of the latter assertion; he believed that the results of practical science would be brought out, but in those places where their want was most strongly felt, and that England would never be behindhand in applying the discoveries of other countries to practical purposes. The Great Exhibition had taught little or nothing in the department of the Fine Arts to those to whom the subject was already familiar, but it had taught a good deal to the public at large.

In conclusion, the probable future results of the Exhibition were considered, many of them being evidently natural consequences of the great principle of open councils, now first introduced; amongst these were, an improved system of international commercial law; a general uniform system of weights and measures; a general and simple, but scientific, classification and nomenclature of all objects, whether natural or artificial; improvements in the Customs regulations; the abolition of the passport system; international copyright; full and complete international catalogues of all printed books; and, lastly, a better and more comprehensive national education, especially in relation to industrial knowledge.

Thanks to the lecturer were moved by Mr. Tuke, and seconded by Dr. Playfair, who in speaking of the international results already produced, referred to the cerrespondence which has recently taken place with the King of Siam, who, he stated, took the deepest interest in the progress of European science, and had already sent over to buy many of the philosophical instruments which were shown in the Exhibition.

It was announced that a paper by Mr. R. D. Hay, on some further investigations in reference to the geometrical principles involved in the construction of the human frame, would be read next Wednesday.

## GREAT EXHIBITION REPORT.

The Second Report of the Commissioners for the Exhibition of 1851 is now printed, and will, no doubt, excite much interest, although the main feature of it, the appropriation of the surplus funds towards an extended plan of industrial education, has for some time been pretty generally known.

## EAST INDIAN EXHIBITION.

The following remarks on the Arts and Manufactures of India, abstracted from a letter recently received from Dr. Alexander Hunter, of Madras, will be read with much interest. The labours of this gentleman, not merely in connection with the excellent School of Arts which he founded at Madras, but indeed, it may be said, in the cause of industrial progress generally, in India, are well known; and give to everything he says, the weight and sanction of practical experience:

I have been engaged for several years in trying to attract attention to the resources of India, and have been most cordially assisted by the public, as well as by a number of scientific friends, who have already begun to contribute specimens of mineral, vegetable, and other products, for the Exhibition. I hope also to be able to forward some creditable busts, statuettes, and figures modelled from life, and cast in porcelain, and plaster of Paris, along with a series of botanical, geometrical, and artistic moulds, casts and fac-simile impressions, taken by a newly-discovered process.

The majority of the public in Great Britain are probably unaware of the system on which the Arts and Manufactures are carried on in India; the working classes with very few exceptions are poor, their wants are few, and they have not the ambition that prompts our European artizans to be industrious, as their Caste prejudices prevent them from rising above their own status; and if they earn enough to keep themselves and their families in comfortable circumstances, they are perfectly content. They always expect and obtain an advance in money for everything that they are going to undertake, and there is nothing like competition in quality or price, there being, in general, combinations or agreements to keep articles always at one standard. The arrangements which were made for the Exhibition of last year, were carried out by the Central and Local Committees on this principle of giving advances for such manufactures as required time and labour for their completion; other articles were purchased outright by the Committees, and the public were invited to assist and contribute under the expectation of being rewarded if their contributions were approved of.

A good deal of information was obtained last year regarding the Arts and Manufactures of India. The prices of most articles were moderate, and there was found to be abundance of skill, originality, and taste amongst the manufacturing classes, with a great desire for improvement; but so little encouragement was given in some branches of artistic manufacture, that it was only on an occasion like this that the articles were called for.

The branches of Art which the Society would do well to call for, or to encourage hereafter, are the drawing and designing of patterns, landscapes and views of Indian scenery, figures, antiquities, bronzes, sculpture, and architecture. Some of the East Indians excel in this, and a few of them receive large orders for water-colour and pen or pencil sketches, which they execute for a moderate sum. The natives are very careful copyists, and excel in anything requiring patience or accuracy of detail. Some of their patterns are tasteful and original. Their drawings on talc are characteristic, though out of proportion. There is considerable talent displayed in the modelling of toy figures of the different Castes, and they have long been celebrated for their dexterity in founding bronze images. They are also very expert in executing elaborate and tasteful designs in stucco or chunam, as solid ornaments for gateways in *alto relievo*—for cornices in perforated tracery—for mosques and minarets in floriated ornament, or in a style peculiar to this part of India, viz., the drawing of bold scroll patterns for interior decoration on a flat wall, with a broad continuous line of uniform thickness. This is a branch of Art in which the natives far surpass European plasterers or decorators; it is confined to a few localities in Southern India, and like the celebrated old stone sculptures of the ceded districts, Mysore, Canara, and the southern Mahratta country, it is an important branch of the true Arts, of which very little is known, and the practice of which is gradually dying out from the want of proper encouragement. I need hardly allude to the dexterity of the natives in the carving of wood, the chasing of metals, filigree-work, weaving, and embroidery, as there were specimens of these in the Exhibition of last year, which were deemed of sufficient importance to be purchased as models of taste in design, care in execution, skill in the manipulation, and knowledge in the arrangement and harmony of colours; they have since been placed in our National Schools of Designs, as studies worthy of imitation by our artists and manufacturers. On these grounds I took the liberty of applying to his royal highness Prince Albert, and to the Committee of the Great Exhibition, for assistance to the artists and manufacturers of India, in the form of an exchange of studies, which request I have every reason to hope will be complied with. But there are a few other points connected with India, which I think it my duty to bring immediately to the notice of the Society. These are the cheapness and abundance of the raw materials in India; many of these which are now lying useless might be rendered valuable with a little careful preparation; or if proper attention were drawn to them, manufacturers might be induced to come out to this country. Many of the articles which are now exported from Great Britain are of second or third-rate quality, and some of them are not at all suited to Indian climates, from a want of skill or attention in their preparation, not a few of the manufactures being the unsaleable rubbish of the London shops. The natives are beginning to take advantage of this, and are neglecting their own manufactures to imitate ours. Europeans are also discovering that though our machinery enables us to make cheaper articles, yet in the long run the labour of the hand is much more durable. As instances, I may state that the imitations of our muslins, checks, and ginghams made in this country are not only much more durable, but the colours are far more permanent, and a few of them brighter than those which we produce on cotton goods. The needlework and embroidery are also cheap and good. The toys, string, rope, paper, colours, brushes, pomatum, and a few other articles, which are now being extensively manufactured in India, are so much cheaper than those sent from Europe, that the exports of these articles will soon begin to diminish. Parties frequently receive commissions for some of the above manufactures from India; it is therefore presumed that the Society are anxious that everything of this kind should be represented in the Exhibition.

## FOREIGN CORRESPONDENCE.

The following letter, received by the Foreign Correspondence Committee, supplies some valuable information respecting the chief Industrial Societies of Holland:

### DUTCH SOCIETIES.

Rotterdam, 30th August, 1852.

Sir,—In answer to your favour of 18th May. I have the honour to send you some information concerning some Institutions in this country which give their attention, directly or indirectly, to the industrial arts, manufactures, commerce, and agriculture. They are, among others,

The Netherland Society of Industry.
Batavian Society of Experimental Philosophy.
Royal Institution of Engineers, and
Agricultural Society in the Province of Holland.

Some years since Agricultural Societies were formed in every province of this country, deriving generally their names from the provinces where they are fixed; their regulations, institutions, and sphere of action, being everywhere the same.

I think you will find in the accompanying documents the information you desire to know.

In my opinion, all those Institutions might, with much advantage to themselves, enter into the Association which the Society of Arts have in view. The Institution best calculated for this purpose is, I think, the Netherlands Society of Industry of Haarlem.

I have the honour to be, Sir,
Your very obedient, humble Servant,
D. R. Gevers Deijoot.

The Secretary of the Society of Arts.

### NETHERLANDS SOCIETY OF INDUSTRY.

This Society, formed in 1777, and existing since seventy-five years, gives attention to Industrial Arts, Manufactures, and Commerce.

The source of this Society consists in any private possession, but especially in the annual contributions of the members. There are about 1,200 members, divided in twenty-five departments in different places of the land, whilst the chief seat of the direction is fixed in Haarlem.

It is governed by nine Directors, and one general Secretary.

THE ACTUAL DIRECTION IS:

*President.*—C. J. de Bruijn Kops.

*Travaglino.*—D. R. Gevers Deynoot, C. J. Glavimans, A. A. del Court van Krimpen, A. Numan, G. Simons, A. H. vander Boon Mesch, H. C. van Hall.

*Secretary*—J. A. van Eeden.

The Society publish since a series of years, a periodic work, called, "Tijdschrift voor Nyverheid;" it comes out three or four times in the year, and is given gratis to the members alone. This periodic work is directed by three professors of different academies.

Besides this are yearly published the annual transactions, and the programme of medals and prizes, which the Society discerns to different branches of industry.

## BATAVIAN SOCIETY OF EXPERIMENTAL PHILOSOPHY, ROTTERDAM.

The objects of this Society, founded, in 1769, by Steven Hoogendijk, are; generally to assist in the advancement, development, and practical application of natural philosophy in connection with the arts, manufactures, commerce, marine, and rural economy of the country.

The members are: 1st, Honorary members. 2nd, Members of the administration. 3rd, Members of the direction. 4th, Advising members. 5th, Corresponding or Foreign members. 6th, Ordinary members.

The Society is governed by a general meeting of all the inland members, assembling every other year, a *præses magnificus* in the chair. In the mean time an administrative and a directorial council, independent of each other, are the leading parties; the administrative council has all the financial, the directorial council, the scientific and domestic parts; both bodies have their several monthly assemblies, and as often as required, together with the *præses magnificus* combined meetings. The following are the Officers for the present:

*Protector.*—His Majesty the King of the Netherlands.

*Mæcenas.*—H. R. H. Prince Frederick of the Netherlands.

*Præses Magnificus.*—T. F. Hoffman, Lord Mayor of Rotterdam.

*Administrative Council.*—J. H. W. Swellengrebel, A. L. Coenen, A. T. Prins, D. R. Gevers Deynoot, T. van Vollenhoven.

*Directorial Council.*—D. F. van der Pant. *Pres. and 1st Sec.*—C. Dalen, C. J. Glavimans, A. G. van Stipriaan Luicius,—P. van Galen, *Der and 2nd Sec.*

The Society takes its revenue from fixed property bequeathed by the founder.

The Society applies its sphere of action in different ways; viz., by

1st, Proposing every other year several questions on practical parts of natural philosophy, in connection with the objects above specified; and by awarding gold or silver medals, and other rewards, for the best scientific productions.

2nd, Monthly meetings in the winter season, of the members resident in Rotterdam, in which lectures on various subjects are proposed, or experiments made.

3rd, Appointing twice a week in the winter evenings, lectures on natural philosophy, and its applications as well popular as scientific. A small admission is paid by such auditors who are not members of the Society; the expenses, however, are not covered by these contributions.

4th, Publishing periodic accounts of their transactions, wherein also appear the answers to the proposed questions which have obtained prizes, memoirs sent in, &c. One or two volumes 4to, are generally published every other year. These transactions the Society exchanges for those of the principal academies or societies in and out of Holland.

5th, Allowing the members, and also the public by application, free admission to their Library and Museum of Instruments.

## ROYAL INSTITUTION OF ENGINEERS.

This Institution was founded in 1848, and incorporated under the above name by Royal Charter in 1848. Its objects are the advancement of the engineering arts and sciences in the most general sense of the term. The seat of the Institution is Delft, where the Royal Academy for Civil Engineers is established It is governed by a president, vice-president, four members, a treasurer, a librarian, and a secretary, who form a council.

The following gentlemen are the Officers for the present year:

*Protector.*—His Majesty the King of the Netherlands.

*President.*—F. W. Conrad.

*Vice-President.*—G. Simons.

*Members.*—H. F. C. Forstner van Dambenay, L. S. A. van der Kun, C. F. van Meurs, J. W. L. van Oordt.

*Treasurer.*—A. Greve.

*Librarian.*—D. J. Storm Buising.

*Secretary.*—B. C. A. Staring.

The Institution consists at present of 313 members, and its revenue is mainly derived from the individual contributions of the members, and donations.

The mode of operation is by a quarterly meeting of all the members, at which various proposals and other objects are discussed, calculated to advance the interest of sciences and arts, and rewards allowed for inventions, treatises, &c. The Institution publishes periodical accounts of its transactions, which are delivered gratis to the members.

## AGRICULTURAL SOCIETY IN THE PROVINCE OF HOLLAND.

This Society was formed in 1847. Its object is to forward the improving and practical application of agriculture, horticulture, cattle, breeding-manufacturing of cheese and butter, the culture of wood, plants, flowers, and every other subject connected with rural improvement in the provinces of South and North Holland.

It is governed by a President, four members, a treasurer and a secretary, who form a council, elected at a general meeting of the Society. They perform the duties of their functions gratis. The following are the officers of the present year.

*Protector.*—His Majesty the King of the Netherlands.

*President.*—F. A. van Hall

*Members.*—D. P. Gevers van Endegeest, Baron P. H. Taets van Ameriongen, G. F. van Tets, Baron B. A. van Verschuer.

*Treasurer.*—H. Hoeufft van Velsen.

*Secretary.*—D. R. Gevers Deynoot.

The Society is divided into forty departments, in the different districts of the provinces of South and North Holland. The number of members is about 6,000, each member paying an annual contribution of two gilders and a half,—about four shillings.

The Society tries to promote its object in various ways. By an annual general meeting consisting of deputies of all the departments of the Society. By meetings of the members in the different parts of the provinces. By proposing prize questions on practical parts of agriculture. By a great general cattle show and exhibition of all products of rural economy, and by many cattle-shows and exhibitions held by the different departments of the Society in their respective localities. By publishing periodical accounts of their transactions, under the title of *Mlededeelingen en Berigten vanhet Hoofdbestuur en van de Afdeelingen der Hollandsche Alaatschappy van Landbourd.* The work is published quarterly, and distributed gratis to the members. It contains observations and practical operations of the members, the program of the general exhibition and its results, and an account of medals and prizes discerned by the Society for the best agricultural productions: and by whatever seems proper to encourage agriculture in general, and to promote the comfort and welfare of husbandmen.

## COLONIAL CORRESPONDENCE.

**WANT of space last week prevented the insertion of the following letter from Berbice, referred to in Governor Barkly's Dispatch from British Guiana. The suggestions respecting the dried fruit of the plantain, the manufacture of plantain fibre, and the improvement of sugar-cane mills, are well deserving of attention.**

### BERBICE.

Reading Society,
Berbice, 15th July, 1852.

SIR,—A printed copy of your letter of 26th March last to the Secretary of State for the Colonies, has, by his Excellency the Governor, been handed to us, accompanied by an invitation to open a correspondence with your Society, for the purpose of promoting the objects set forth in the enclosure contained in your letter. The Committee of the Reading Society, fully appreciating the importance to an agricultural and manufacturing country like this, of communication with a body devoted to the development of improvements in the arts, manufactures, and commerce, gladly avail themselves of this invitation, and have accordingly appointed the undersigned to commence the correspondence.

There are many natural productions in this Colony which doubtless will one day be found to possess commercial value, and we should be happy to forward to your Museum any specimen that may promise to prove such, if you would kindly furnish us with general instructions as to the nature of the objects likely to be acceptable, and the mode in which they should be forwarded. Possibly our forests may contain Gutta Percha, Indian Rubber, Ivory Palm, and other valuable trees, but as yet undiscovered. Had we drawings of these plants we might set the Indians to search for them.

This country abounds in plants yielding a most excellent fibre for ropes or cloth; also in trees yielding valuable gums and materials for dyeing; but these matters hitherto have been little regarded. But there is one subject which would meet with immediate attention, and is of great importance; viz., the method of drying and preserving plantains, which we observe is described, in Professor Lindley's lecture, as being carried to such excellence in Mexico, that the plantains have kept good for fifteen years. We fear the moisture of this climate would be against their keeping so long here; but to be able to preserve them for a few months only would be a very great advantage, as it is the principal food of the people. A description of the process used in Mexico would be most acceptable.

We should be very glad to receive copies of the printed proceedings of the Society of Arts, and will direct our booksellers, Messrs. Smith, Elder, and Co., of Cornhill, to purchase them for us if they are for sale.

The Reports of your Special Committees presiding over such departments as concern us, as Sugar-planters, would be of great value to us. There are inventions and patent improvements continually offered to our notice, and we often feel the want of the disinterested judgment of scientific men to guide us.

We may, perhaps, be allowed to mention the subjects on which we are more particularly desirous of obtaining information. They are chiefly mechanical.

The only staple commodities we export from British Guiana now that cotton and coffee have ceased to be cultivated, are sugar, rum, and molasses,—all the products of the sugar cane. This valuable plant is said to be composed of ninety parts in a hundred of fluid, and ten parts of solid substance; and the first operation in sugar-making is to separate the one from the other. This is performed in this Colony by crushing-mills, with three horizontal rollers, worked by steam engines. From these mills we seldom obtain more than 60 or 70 per cent. of juice, often less. Any improvement in these mills, or better substitute for them, is a great desideratum. Of the cane-juice when obtained, three-fourths have to be evaporated by boiling; consequently a rapid and economical method of evaporating liquids is an object of the greatest importance to the planter. He is also deeply concerned in improvements in the construction and mode of working of steam engines and boilers, of pumps and contrivances for raising water,—also in draining-engines for discharging large quantities of water, with a lift of four or five feet; in stills and apparatus for making and rectifying spirits; in machines for curing sugar, or separating it from its molasses; in cranes, &c., for lifting heavy weights; in cheap roofing or covering for large buildings. Also in steam ploughs, and modes of cultivating land by machinery, for which this flat country is better adapted than most others. Our cane-fields are all rectangular figures, about 300 yards long, by a width of 150 or 160 yards, and surrounded on three sides by navigable canals, capable of floating punts drawing two feet water; so that if steam engines can ever be used for tilling the land, our canals offer great conveniences for their operations, and our soil being an alluvial clay, free from all stones, would be admirably suited for the purpose.

The successful adaptation of machinery to the tillage of the land in this country would be the greatest possible boon we could receive,—the only limit to the production of sugar in British Guiana is, the supply of labour, which is lamentably deficient. With plenty of labour, or mechanical substitutes for it, we would not fear competition with any part of the world.

Such are a few of the subjects on which we should be thankful for instruction, and we hope it will be in the power of your excellent Institution to furnish information that may be of practical utility to this Colony.

We have but little to communicate in return, but will willingly co-operate with the Society of Arts in furthering the wishes of the Council, if you will be good enough to point out to us in what way we can make ourselves useful.

We are, Sir, your obedient Servants,

JAMES LAING,
ALEXANDER WINTER,
R. BARNES.

The Secretary of the Society of Arts.

Google

# HOME CORRESPONDENCE.

## DIAGRAMS.

Literary Institution, August 14th.

SIR,—It did not occur to me at our Committee Meeting on Tuesday that it would be convenient, and of great benefit for local lecturers to be enabled to obtain the necessary diagrams, models, and drawings for the illustration of lectures, but I have since considered the subject, and would suggest that if the parent Society would, on moderate terms, lend the appropriate illustrations, which are attainable in the country only at a great expense of time and money, and then only serve for one lecture, many gentlemen would come forward and give lectures at the various Institutions with which they are connected, and these bodies would obtain a great amount of information at a far less expense than if they hired a professional lecturer on the subject.

I have myself been deterred from volunteering to lecture in our Institution, because, being in extensive medical practice, I have not the time to execute the necessary drawings and diagrams in order to give proper effect to a lecture on Natural History, Physiology, Electricity, Hydraulics, and other subjects of Natural Science. I should think the Society could procure the necessary apparatus at a small outlay, which would quickly be repaid by their charging a small sum for the loan of each series.

Perhaps you will kindly suggest this to the Committee of the Society, as they are so good as to ask for any proposition which may advance the interests of the Institutions connected with them.

I am, Sir, your obedient servant,
G. F. W.

E. Solly, Esq., Sec. Soc. Arts.

## MUSEUMS.

Mechanics' Institute, 17th Sept. 1852.

SIR,—Although of opinion that the most easy way in which the different Institutions could contribute to the formation of local museums would be by sending these contributions to London, and distributing them from that point to the different places requiring them, yet we are quite as willing to adopt the plan indicated by your circular of the 28th August (marked B. Museums 2), and will on our part assist as much as we can. We think that collections from the Staffordshire iron, lime, and coal district may be formed, and have appointed a sub-committee for that purpose, but it will be some time before such collections could be got ready.

In the mean time *at once* we will send to any Institution wishing for such a collection, and willing to supply us with corresponding collections of either their manufacturing or other processes, a box containing specimens of all the new materials used in the manufacture of earthenware and china, and also specimens of the article in every stage of its progress, from the first rude form until it is fit for market.

With the gentlemen mentioned as belonging to "one of the midland counties," we are ready to make the exchange referred to.

The most acceptable collections to us would be those illustrating the geology, mineralogy, &c. of different formations.

I am, Sir, yours sincerely,
J. S.

Edward Solly, Esq., Adelphi, London.

## LOCAL EXHIBITIONS.

———, 2nd August, 1852.

SIR,—I take leave to bring under your notice a subject which has been talked over by some of the members of the Institution here, but in doing so you will understand that it is not in an official capacity that I write.

It was proposed to have an Exhibition here in the summer of 1853; and in discussing the manner in which it should be carried out, it was at first suggested to make it a national affair, at least as regards Scotland, something like the Cork Exhibition. This gave rise to another idea; namely, to extend the nationality to Great Britain, and that it should be the first of a series of Annual Exhibitions in different places of the kingdom every year,—the second to be in England, say Leeds or Sheffield,—the third to be in Scotland, Glasgow or Paisley,—and so on, so that it might not be in consecutive years in one part of the country. The profits arising to be for the benefit of the Institutions in the respective places or neighbourhoods where the exhibition was held.

It was conceived that the scheme might be taken up by the united Institutes, by which mutual assistance could be rendered. A building could be devised of such a nature as to be removable from one place to another by rail, and so contrived that additions could be made to it should that be found necessary. It is probable that for such places as Glasgow, Liverpool, or Manchester, the same size of a building would not suit as for smaller towns.

Could such a scheme be organized and carried into operation, it is believed that it might be the means of largely benefiting local Institutions; and the extent and facilities now possessed of communication by means of railways, gives every reason to believe that if properly got up they would be successful.

Without entering into further details, I place the proposition before you, as requested, leaving it for your more deliberate consideration.

I am, Sir, yours faithfully,
A. Y.

Edward Solly, Esq.,
Society of Arts, London.

## TAXES.

9th Sept., 1852.

SIR,—I think, myself, that Institutions should be exempt from taxation: the Literary and Scientific Societies' Act seems, however, to have proved almost a dead letter; though there cannot be a doubt that Mr. Wood's intention in introducing it, was to benefit Mechanics' and similar Institutions. There seems, at present, to be no clearly defined idea, as to who is, and who is not liable to taxation. We did hope, a short time ago, to have escaped; but Lord Campbell's late decisions appear to have strengthened the Overseers, &c., in enforcing the rates. This Institution pays from forty to fifty pounds a year in taxes, though no sum whatever comes into the exchequer that is not applied to the wants of the members. We have no shareholders; we give no bonuses; all our officers are non-members. The property belongs to the members, and they alone receive the advantages which their subscriptions afford. I think education should be free as trade and commerce, and if you can, by your influence, still further remove the barriers to progress by freeing education from taxation, you will have effected a decided public good. There are those who think Institutions should be taxed equally with private persons.

Yours most truly,
H. S.

E. Solly, Esq.

Bristol, Nov 29th, 1852.

Dear Sir,—The Society of Arts would confer a great boon on Athenæum and Mechanics' Institutions, by using their influence in obtaining some amendment in the law, 6 and 7 Vict. c. 36, relating to the exemption of Scientific and Literary Societies, from parish and other local rates. I have now before me a report of appeals which have been made by various Institutions against their local rates, and although the society may have obtained the certificate of John Tidd Pratt, Esq., that the society *was entitled* to the benefit of the Act before referred to, yet, in almost every instance the appeal of the Society was insufficient: surely the various technicalities of the law in this respect require alteration. To obtain exemption a society "must be instituted for purposes of science, &c., EXCLUSIVELY," "must *solely* occupy their premises," "must not make any dividend," "lecture-Hall or theatre must not be let," &c.

I am, dear Sir, yours faithfully,
B. G.

### MANCHESTER COLLEGE OF ARTS AND SCIENCES.

Norwich, Nov. 27.

Sir,—As the subject of Industrial Education and Working Men's Colleges is now exciting a good deal of attention, I venture to draw attention to the Manchester College of Arts and Sciences, which was founded in 1783 by Dr. Barnes. There seems to me to be so much that is true and sensible in the plan or prospectus of that Institution, that I should be glad to be informed what was the fate of the college, and why it was given up:—possibly your correspondents at Manchester may be able to give some account of it. In the printed proposal for establishing this college, Dr. Barnes says: "It is proposed that several gentlemen shall unite together in delivering a course of liberal instruction in languages, the *belles lettres*, history, commerce, law, ethics, natural philosophy, chemistry, and mathematics;" and a sketch of the nature of the college was printed as soon as it was established, because it was thought desirable "that similar establishments should be formed in other large towns." The college certainly was established, for in the printed account it is stated that lectures were delivered to large numbers of persons during two sessions, and further, that the college was under the patronage of the right honourable the Earl of Derby, who was "happy by every means in his power to promote an undertaking carried on upon such liberal principles, and directed to such a noble and beneficial object." It would be very interesting to know why so excellent a scheme, supported by the talent of Dr. Percival, Mr. Henry, and the other learned men living at Manchester at that period, and having at the same time "Right Honourable" patronage, came to an untimely end.—I am, Sir, yours obediently,

T. C.

## REPORTS OF INSTITUTIONS.

### DENTON AND HAUGHTON MECHANICS' AND LITERARY INSTITUTION.

The Second Annual Report of this Institution while lamenting the indifference and carelessness of the adult labouring population of the neighbourhood, for whose especial benefit it was designed, expresses the belief that, in the younger members, they have a pledge of future prosperity. The reading-room and lectures have not been so numerously attended as was expected, but the number of books issued from the library has been pretty uniform, and the progress of the classes satisfactory. From the Treasurer's statement of accounts, it appears that,

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|---|---|
| The receipts during the year have been | £80 15 0 |
| The expenditure do. . . . . | 76 10 11 |
| Leaving a balance of . . . | £4 4 1 |

The following are the officers for the ensuing year.

*Patrons*—The Right Reverend the Lord Bishop of Manchester; The Right Hon. the Earl of Wilton; J. F. Fletcher, Esq., and J. Sidebotham, Esq.

*President*—W. Peacock, Esq.

*Vice-Presidents*—Messrs. J. L. Rockliffe, and M. Taylor.

*Treasurer*—Mr. J. Barker.

*Hon. Secretary*—Mr. J. Lupton.

*Librarian*—Mr. J. Holroyd.

### MACCLESFIELD USEFUL KNOWLEDGE SOCIETY.

The Annual Meeting of this Society took place on Tuesday evening, the 23rd ult., in the Town Hall, Macclesfield. The Mayor, in the absence of the President, John Brocklehurst, Esq., M.P., took the chair.

The Secretary, Mr. D. B. Curwen, read the Report, from which we make the following extracts:

"The originators of this Society felt that, in a town like this, containing so many thousand persons, it was absolutely necessary to provide means whereby the minds of the middle and working-classes might be awakened, elevated, and improved. They, therefore, endeavoured to provide the means. They knew that this would entail upon them an arduous and anxious task, but knowing, 'that there is nothing truly valuable which can be purchased without pains and labour,' and feeling confident they should succeed in the object they had in view, they set about their work with a good heart, and in right earnest, and their labours have been rewarded in the success of their Institution, which now ranks the first and foremost in the town.

"It will be remembered that in the last Report, the Committee announced the formation of the Macclesfield School of Design, which is now conducted by its talented master, Mr. G. Stewart, in the spacious room erected and appropriated for it by this Committee. They are happy to state that many of the Society's pupils avail themselves of the privileges afforded them by the School, and the Committee therefore, annually contributes to its funds.

"At the commencement of the present year, circumstances occurred which rendered it incumbent on the Committee to consider the necessity of establishing an extra Reading and News Room, their then only Reading-room (though large) being often inconveniently crowded, and incapable of affording the necessary accommodation to the members. Though the Committee considered that they should not be altogether justified in providing the whole additional expense from the Society's funds, as then constituted, yet they also considered that it was their duty to provide for the accommodation of the Honorary Members, by whose subscriptions the Society is mainly supported, and whose principal, and, in many instances, only return for their subscriptions are the privileges connected with the Reading and News Room, and Library. Under these circumstances, and after mature consideration, the Committee proposed to the Honorary Members, the payment of an additional subscription of 5s. annually towards the extra expense, and this proposition having been cheerfully and generously acceded to by many of them, the Committee opened an additional Reading and News Room in March last, which is now attended by nearly seventy Honorary Members, each subscribing 16s. per annum to the Society's funds. * * * Shortly after the establishment of this room, the Committee directed their attention to the formation of a Female Class, an object they have had in view for some time, and they are happy to announce that they have succeeded in forming such a class, and that it is regularly attended three times a week by a considerable number of females, who, under the care and guidance of Mr. Malborn are progressing rapidly in reading, writing, and arithmetic, and under the kind care and instruction of several ladies, are also engaged in learning sewing, knitting, and other female accomplishments. * * * The formation of this class is only part of a scheme the Committee are desirous of effecting, and which they hope their successors will be enabled to accomplish, namely, the formation of Female Classes in union with the Society, similar to those belonging to the Mechanics' Institutions in Liverpool and Manchester, and which have been productive of great benefit to both those towns. * * *

"The Committee are sorry to say, that they still find the providing of lectures a profitless affair; they have, therefore, only had one lecture during the year. They again regret that lectures on useful and beneficial subjects, when provided for the members, should be so thinly attended. * * * * *

"The Committee have much pleasure in stating that all the classes are progressing well and favourably, and that the character of the Society, for imparting sound and useful knowledge, has been this year maintained in all its efficiency: and that the teachers deserve the thanks of their pupils, the Committee, and the town.

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| The receipts during the year have been . . . . . . . . . . | £511 | 12 | 6 |
| The expenditure . . . . . . . | 504 | 2 | 4 |
| Leaving a balance of . . . . . | £7 | 10 | 2 |

"The Committee have to report that their classes are overflowing, while their means of accommodation are limited, and their capabilities of doing good are cramped for want of room. They are, therefore, desirous of being enabled to commence their oft-proposed Lecture Hall, which, in addition to its use for lectures, concerts, &c., might also afford increased accommodation to the various classes; and they recommend their successors, as soon as they have reduced the present heavy debt on the building (about 900*l*) to commence a subscription for the Lecture Hall."

The meeting was then addressed by the Rev. W. R. B. Arthy and Mr. Richard Wornum; after which the Secretary read the Reports of the Teachers of the different classes,—French, Geography, History, Grammar, Reading and Dictation, Mathematics, Arithmetic, Stenography, Reading, and Writing, and the Female Class. The average number of members in these classes is about forty-five. In all cases the reports state the progress to have been most satisfactory. The distribution of the prizes which had been awarded by the different teachers then took place.

The following gentlemen were elected to fill the several offices during the ensuing year:

*Patron*—The Most Noble the Marquis of Westminster.

*President*—John Brocklehurst, Esq., M.P.

*Vice-Presidents.*—The Right Hon. Lord Stanley, (of Alderly), T. Broderick, J. Williams, S. Greg, J. Wright, and T. R. Daintry, Esqs.

*Treasurer*—R. Bagshaw, Esq.

*Hon. Sec.*—Mr. Curwen.

*Sec. and Libr.*—Mr. T. Kelly.

*Committee* — Wm. Adshead, Esq., Mayor; Messrs. J. Arnold, W. Bullock, T. Bullock, W. Cornes, B. Fawkner, W. Norris, W. Potts, J. Smith, G. Tipping, R. Wilson, J. Birch, J. G. Booth, J. Brunt, W. Jones, W. Jeffrey, W. Mee, J. Moss, J. Platt, W. Smale.

*Auditors*—Messrs. W. May, jun., G. Barton, and J. O. Smith.

## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ROYAL SCOTTISH SOCIETY OF ARTS.—Nov. 22. THE first meeting of the thirty-second session of this Society was held on Monday evening in the new hall of the Society, opposite the Assembly-rooms, when an introductory address was delivered by Dr. George Lees, the retiring President.

Dr. LEES said that while he had to congratulate them on the increasing prosperity of the Society in regard to numbers, and in regard to the general excellence of the papers which had been submitted to their notice, they had to deplore the loss of several of its most prominent members. After paying a just tribute to the memory of Mr. Grainger, C. E., Sir W. Newbigging, and Mr. Buchanan, C. E., he remarked, that, in looking back on the history of science, he could not help coming to the conclusion that, with the exception of mathematics and astronomy, they were under no very great obligation to the philosophy of the ancients for the knowledge which they now possessed. Indeed, the ancient philosophers, for the most part, knew nothing of science. Even when it was discovered that the principles of mathematics might be applied to the improvement of mechanics, the attempt was discouraged on the ground that philosophy was degraded by being made subservient to purposes of mere vulgar utility. Dr. Lees then alluded to the inductive philosophy of Bacon, which inverted the order of study of the ancients. But, without detracting from the merit of Bacon's great work, it seemed, he said, to be the general opinion that science would have progressed just as well, though the *Novum Organum* had never been written. He then reviewed at some length the vast achievements of physical science since the time of Newton, and stated his opinion that, while metaphysicians complained of this "mechanical age," their inquiries had done nothing to ameliorate the condition of man, or raise him in the scale of intelligence; and that, while metaphysics was ever moving in a circle, ending where it began, physics was pre-eminently a science of progress.

The office-bearers for the present session were then appointed. Mr. David Stevenson, C. E., being chosen President, and Mr. Robert Ritchie, and Dr. Daniel Wilson, Vice-presidents.

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SOCIETY OF ANTIQUARIES, Nov. 25.—This Society has been in a state of excitement for nearly twelve months, in consequence of an alteration in the payments originally suggested by the Treasurer. Instead of an annual payment of four guineas, he suggested a payment of two guineas, and further proposed to reduce the entrance fee from eight guineas to five guineas. The Society confirmed this proposition last Session by a majority of fourteen. But the movement was strongly opposed by Mr. Pettigrew, who moved an amendment to the effect, "that any reduction in the amount of the annual subscriptions appeared to be uncalled for and injudicious." The question was again brought forward at the meeting of Thursday last, when the reduced subscription was opposed by Mr. Lott and Mr. Pettigrew, and supported by Mr. Tite and Mr. Drake, the latter arguing that by reversing the rules so lately promulgated, the Society would stultify itself; whilst Mr. Pettigrew asserted that the depressed state of the Society was not caused by the high subscription which Fellows had to pay, but arose solely from the want of activity and energy in the Council. On the ballot being taken, there was found to be a majority of eleven in favour of the low rate, or four less than in the previous Session.

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BOTANICAL SOCIETY OF LONDON, Nov. 29TH.—J. E. Gray, Esq., F.R.S., President, in the Chair. This was the Sixteenth Anniversary of the Society. MR. G. E. Dennes, the Secretary, read the Report of the Council, from which it appeared that fourteen new members had been elected since the last meeting, and that the Society now consisted of 302 members. Many thousands of specimens of British and foreign plants had been distributed to members and numerous Continental botanists, and increased exertions had been made this year to render this important department of the Society's operations more efficient, and already numerous valuable specimens had been received, for distribution to the members in January next. Various donations had been made to the library by members, and by British and Foreign Scientific Societies. The report was unanimously adopted; after which, a ballot took place for the President and Council for the ensuing year. When the President was re-elected, and he nominated John Miers, Esq., F.R.S., and A. Henfrey, Esq., F.R.S., Vice-presidents.

John Ball, Esq., M.P.; F. P. Pascoe, Esq., F.L.S., and J. T. Syme, Esq., were elected new members of the Council, in the room of Dr. Palmer, J. Coppin, Esq., M.A., and J. Woolett, Esq. The Secretary and Librarian were re-elected.

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INSTITUTION OF CIVIL ENGINEERS, Nov. 30TH.—J. M. Rendel, Esq., President, in the Chair. The evening was entirely devoted to the discussion of Mr. Rawlinson's paper, "On the Drainage of Towns." The town of Itchen was given as an example, where 60,000 feet of pipe sewers from 20 inches diameter downward, had been in action for four months with perfect success; the average depth below the surface was eight feet, and the outlet of the main sewer, which was 5,000 feet in length, and only 20 inches in diameter, was laid beneath the bed of the river, at an inclination of 1 in 800. This was designed for the sewerage of 1,000 houses, of which only 200 were at present connected, and 1,100 acres of urban and suburban drainage. In the instance of Manchester, where, during the last eight years, a great extent of oval pipe drains, 25 inches by 18 inches, had been laid with success, it was explained that they were 2½ to 3 inches in thickness, and were laid with great care in very strong ground. The maximum size at which, even these thick pipes were preferable to brick sewers, was 36 inches by 24 inches. The smallest size made for small streets was 12 inches by 9 inches, and for foul water only 6 inches by 4 inches. The largest area draining into a pipe sewer was fifty acres. It was admitted that, for pipe drains laid at a depth of 15 feet, 12 inches or 15 inches diameter, was the utmost limit of practical utility; above that size brick sewers would be preferable—particularly if hollow bricks were used. A brick sewer of 3 feet in diameter, would cost as little as a pipe drain of 20 inches diameter. The latter had only been adopted at Itchen, on account of local difficulties, which were by these means more readily met. It was contended that the ordinary rain-fall must be provided for in the size of the sewers, or else great injury to property must constantly ensue; that with due precaution, there was little actual danger in excavating among houses for large sewers; that in sewering a town, the ultimate expense must be the main consideration, and if the streets were to be constantly torn up to discover stoppages, not only would the expense be much increased, but the inconvenience it would cause would be incalculable.

## PROCEEDINGS OF INSTITUTIONS.

BIRMINGHAM.—At the instance of the Polytechnic Institution, Mr. George Dawson recently gave a lecture in the Town Hall, on "Wellington and Napoleon; a Parallel and a Contrast." The lecture, which was very numerously attended, entered into a minute analysis of the characters and ambition of the two warriors; and was concluded with the expression of the belief that as peace became more loved, war more hated, and men just, would Wellington's name abide in far more honour than Napoleon's.

BRISTOL.—Mr. Harwood's second lecture at the People's Institution, on "The Railway System," was chiefly directed to a consideration of the social effects of the system. The lecturer stated that the facilities afforded by railways, enabled the principle of the division of labour to be carried to an unparalleled extent, by which means the whole community experienced a permanent advantage, in the increased cheapness of all articles of production. Agriculture was benefited by a cheap and speedy transit of lime and manures, and of agricultural produce. But the railway system, as well as improving the physical well-being of man, had tended greatly to develop the moral well-being, and had in many districts fixed the standard of education, by the necessity for men learning to read and write, in order to qualify themselves for employment under railway companies.

Cheadle.—On Wednesday evening, the 24th ult., the first lecture of the season at the Mechanics' Institution was delivered by the Rev. C. P. Wilbraham, Vicar of Audley, on "The Difference between Civilized and Savage Life."

Darlington.—On the 23rd ult., Mr. James Cooke delivered a lecture at the Mechanics' Institution, on "The Manufacture of Iron." Specimens of ore from many countries were exhibited, and the peculiarities of each distinctly pointed out. The process of smelting was explained, and the different methods employed in treating the various kinds of ore, and the yield obtained from each were described.

Leeds.—Dr. Reinhold Solger gave the first of two lectures, at the Mechanics' Institution and Literary Society, "On the Kings and Courts of the Eighteenth Century." The problem which the learned Dr. attempted to solve, was to ascertain how it was that continental Europe exhibited so strong a contrast with Great Britain, in regard to constitutional liberty. Ascribing much to the mixture of races, he still thought more of the stability of England arose from her position, which had enabled her to escape territorial war; while, paradoxical as it might seem, he believed that our *civil* wars had served to develop the best elements of our national character, and secure that civil and religious liberty which Englishmen so justly boast of. In referring to France, Dr. Solger drew a fearful picture of the evils of absolutism, from the memorable 10th of April, 1665, when Louis XIV. told the parliament of Paris that their function was to record his decrees, not discuss them, through nearly two centuries of corruption, profligacy, and wrong.

Modbury.—A Lecture was delivered at the Institution in this town, on Thursday, November 25th, by Dr. Shortland, of Plymouth, "On certain plants which grow on living animals, causing disease or death." The discoveries which the microscope had revealed, in regard to the fact of certain species of parasitic fungi being found living on the animal frame, were brought prominently forward by the lecturer, in a very interesting manner.

Newcastle.—The anniversary meeting of the Mechanics' Institution was held under the presidency of the Mayor, N. G. Lambert, Esq. The meeting was addressed by Mr. Greenhow, "On the Advantages of Mechanics' Institutes in cultivating the Mind." After some preliminary remarks on the origin and objects of Mechanics' Institutes, and the privileges enjoyed by the members of such bodies, Mr. Greenhow stated that already six classes were formed, by which instruction was given in chemistry, geometry, arithmetic, grammar, and the English, German, and French languages. In addition to these classes there was a library, containing from 8,000 to 10,000 volumes, and a reading-room, well supplied with local and metropolitan newspapers. The meeting was afterwards addressed by Mr. Crawshay, Sir John Fife, Mr. Rea, and Mr. Harle.

Sherborne.—A very crowded meeting assembled in the Town Hall, on Friday evening, to hear the Rev. J. H. Davies deliver his Lecture to the members of the Literary Institution, on, "The Peninsular War, elucidating the character of the Duke of Wellington." The subject is stated to have been most brilliantly treated, and the lecture to have been an historical essay equal in grandeur and impressiveness to the writings of many of our first authors.

Southampton.—"Newspapers" formed the subject of an interesting lecture, by the Rev. S. S. Pugh, at the Polytechnic Institution on Wednesday evening. After citing the testimonies borne to the value of a free and unfettered press by the great men of past and present ages, the lecturer entered upon a carefully prepared review of the history and progress of the newspaper press, from the first circulation of manuscript "news-letters" down to the present time, when it might be said to rank as the fourth estate in the realm. The first imposition of taxes on knowledge, and the crippling effect they had on the advancement of a cheap and wholesome literature, were noticed, and the necessity for their speedy abolition ably and powerfully argued.

Uttoxeter.—A very interesting lecture on "Assyria, and the Buried Palaces of Nineveh," was delivered at the Literary Institution, on the 19th ult., by the Rev. J. A. Baynes, of Nottingham.

Uxbridge.—On Tuesday evening, the 23rd ult., a lecture was delivered by Martyn Roberts, Esq., F.R.S.E., at the Literary and Mutual Improvement Society, "On the application of Electricity to the Arts." The process of electro-plating was first explained, the production of light by electricity, and the principle of electric clocks being taken in succession. The Lecturer then described, in a lucid and clear manner, the nature of the electric-telegraph, and gave a brief sketch of its history.

Windsor.—The first of a course of lectures, "On the Physiology of the Senses," by W. Rayner, Esq., of Uxbridge, was recently delivered at the Literary, Scientific, and Mechanics' Institution. This lecture, which was illustrated by a number of elaborate diagrams, was confined to the consideration of the Sense of Touch.

## MISCELLANEA.

Forbes's Cylindrical Ship Life-boat.—This Life-boat is thirty feet long, eight feet wide, and two feet deep, and is said to be capable of carrying with ease sixty persons, with provisions for a week, in the air-tight seats; cannot be upset, or swamped; can be pulled either end-foremost; can be steered with an oar; has extra buoyancy in water-tight compartments; and is so constructed, that a hole may be knocked into one or more divisions, without danger to the whole. She stows the following stores: masts, sails, oars, and everything complete, so as to be always ready for use on any sudden emergency. When folded up, it is perfectly cylindrical; and on reaching the water, opens out, and can in a minute be made a stiff boat; and the dimensions can be modified to suit any vessel.

**Cleopatra's Needle.**—The fate of this monument has at length been decided through the exertions of the Crystal Palace Company. Lord Derby permits the removal of the column, and its erection in the Sydenham grounds, upon condition that the Government may hereafter reclaim it on payment of all expenses incurred in the transit. Steps have been already taken to effect the removal of the column. It is understood that his highness the Pasha will afford the Directors every facility on his side of the Mediterranean, and that other interesting works of antiquity from Luxor and Karnak will accompany Cleopatra's Needle from the Egyptian shores.

**Discovery of an Ancient City.**—Captain Alfred K. Fisher, of this town, informs us, that when on the last whaling voyage, in the ship *America*, of New Bedford, which was about eight years ago, he had occasion to visit the island of Tinian, one of the Ladrone islands, to land some sick men. He stopped there some days. One of the men, in his walks about the island, came to the entrance of the main street of a large and splendid city in ruins. Captain Fisher, on being informed of the fact, entered the city by the principal street, which was about three miles in length. The buildings were all of stone of a dark colour, and of the most splendid description. In about the centre of the main street he found twelve solid columns, six on each side of the street; they were about forty-five or fifty feet in height, surmounted by cap-stones of immense weight. The columns were ten feet in diameter at the base, and three feet at the top. Captain F. thinks the columns would weigh about sixty or seventy tons, and the capstones about fifteen tons. One of the columns had fallen, and he had a fine opportunity to view its vast proportions and fine architecture. From the principal street, a large number of other streets diverged. They were all straight, and the buildings were of stone. The whole of the city was entirely overgrown with cocoa-nut trees, which were fifty and sixty feet in height. In the main street pieces of common earthenware were found. The island has been in possession of the Spaniards for a long time. Six or seven Spaniards resided on the island when Captain Fisher was there. They informed him that the Spaniards had had possession about sixty years; that they took the island from the Kanakas, who were entirely ignorant of the builders of the city, and of the former inhabitants. When questioned as to the origin of the city, their only answer was, "There must have been a powerful race here long ago." Here is food for a speculation. Who were the founders of this once magnificent city in the North Pacific, and what has become of their descendants? —*United States Gazette*.

**Monument to Daguerre.**—The *Société Libre des Beaux Arts*, Paris, have erected a monument at Brie-sur-Marne, to the late M. Daguerre, well known by his dioramas and the process of sun painting which bears his name, and on the 4th inst. they met to inaugurate it. The monument is simple. A railing of iron surrounds a monumental pillar, which is on a granite pedestal: the upper part of the pillar carries a medallion portrait of Daguerre by M. Husson. M. Rohault de Fleury was the architect.

**Photography: the Fixation of Colours.**—M. Niepce de Saint-Victor laid before the Paris Academy of Sciences, at the sitting of the 8th of November, daguerreotypes upon which he had succeeded in fixing, in a manner more or less permanent, colours by the camera obscura. M. Niepce states, that the production of all the colours is practicable, and he is actively engaged in endeavouring to arrive at a convenient method of preparing the plates. "I have begun," he says, "by reproducing in the dark chamber coloured engravings, then artificial and natural flowers, and lastly, dead nature—a doll, dressed in stuffs of different colours, and always with gold and silver lace. I have obtained all the colours: and, what is still more extraordinary and more curious is, that the gold and the silver are depicted with their metallic lustre, and that rock-crystal, alabaster, and porcelain, are represented with the lustre which is natural to them. In producing the images of precious stones and of glass we observe a curious peculiarity. We have placed before the lens a deep green, which has given a yellow image instead of a green one; whilst a clear green glass placed by the side of the other is perfectly reproduced in colour." The greatest difficulty is that of obtaining many colours at a time; it is, however, possible, and M. Niepce has frequently obtained this result. He has observed, that bright colours are produced much more vividly and much quicker than dark colours: that is to say, that the nearer the colours approach to white the more easily are they produced, and the more closely they approach to black the greater is the difficulty of reproducing them. Of all others, the most difficult to be obtained is the deep green of leaves; the light green leaves are, however, reproduced very easily. After sundry other remarks, of no peculiar moment, M. Niepce de Saint-Victor informs us, that the colours are rendered very much more vivid by the action of ammonia, and at the same time this volatile alkali appears to fix the colours with much permanence. These results bring much more near than hitherto the desideratum of producing photographs in their natural colours. The results are produced upon plates of silver which have been acted upon by chloride of copper, or some other combination of chlorine. The manipulatory details have not been published, but we understand they are very easy.—*Athenæum*.

**Premiums** offered by the Academy of Belles-Lettres and Inscriptions for 1853, the prize in each case being a gold medal value 2,000 francs. "How and by whom have been executed in France, in the feudal times down to the death of Charles V., great public works, such as roads, bridges, canals, churches, etc." "What new notions have been brought to the history of Greek sculpture from the most ancient times to those of Alexander, by the specimens placed in the museums of Europe since the beginning of the present century?" "To restore the ancient geography of India, from the earliest times to the period of the Mussulman invasion." In addition, the following is the subject proposed for the ordinary prize of 1854:—"To examine the state of accentuation in the Latin inscriptions to the end of the fifth century, and compare it with the rules laid down by Quintillian, Priscian, and other grammarians, and to endeavour to give a complete theory of the employment of the tonic accent amongst the Romans."—*Galignani*.

**Juxtaposition of Scientific Societies.**—An opinion has for some years been entertained, by a number of the members of the chief scientific societies of London, that the utility and efficiency of these bodies, which are now scattered in all parts of London, would be greatly increased by their being brought together, and located under one roof. Hitherto no active steps have been taken by any of the societies, though it is nearly half a year since the matter was formally brought forward by the Council of the Royal Society. There can be no doubt that much benefit to science will arise if any arrangement of this sort can be really carried out; at present, however, it appears as if "vested rights" and petty jealousies were almost too powerful to be overcome. It is also to be regretted that an attempt is made to distinguish pure from applied science; it is impossible well to draw a line of distinction between the two, and all that may be said in favour of the juxtaposition of societies for the prosecution of natural knowledge, applies with equal force to the union of the two classes.

**Scientific Balloon Ascents.**—The four ascents which recently took place from Vauxhall at the expense of the Royal Society have been altogether highly satisfactory in their results. The circumstances under which these ascents took place were peculiarly favourable, and the advice and aid rendered to the scientific observers by Mr. Green, no doubt, were of the highest importance. The chief object in view was to obtain a continuous series of observations on the relation of atmospheric pressure, temperature, and the proportion of moisture in the air. The data obtained will prove of great value in meteorological science generally, and will be of especial service in all astronomical calculations in which atmospherical refraction is an element. It is obvious, however, that further observations of the same kind will be desirable in other parts of the globe.

**A Lesson for Mechanics' Institutions.**—Among the cases brought before the Magistrates at Nottingham on Thursday, at the instance of the overseers of St. Mary's parish, there was one of peculiar interest to the people concerned in the management of Mechanics' Institutions. Mr. George Hall, the resident librarian of the Nottingham Mechanics' Institution, was pursued for 8*l.* 8*s.* 9*d.*, poor-rates, chargeable on the Institution, but which he had refused to pay. This is the first time, we believe, in which the overseers of the parish had endeavoured to lay rates upon the Institution in question, and they have been prompted to the step apparently by the character of the exhibitions for which the large hall has from time to time been let to itinerating individuals Mr. Bowley appeared for the officers; and Mr. Hall, on behalf of the Institution was accompanied by Mr. Enfield, vice-president, and Mr. Renals, honorary secretary. We should state that all literary, scientific, and artistic institutions, like the Mechanics', are especially exempted from paying rates, on account of their purely literary, scientific, or artistic character. But in the present case, the hall has been let for purposes aside from those specified; and Mr. Bowley contended that, as neither an exhibition of monkeys and dogs, nor yet an auction, pertained to literature, so the Institution had exceeded its real purposes, and was no longer to be excepted by the overseers under the provisions of the statute. Mr. Hall, on the part of the Institution, contended that though the entertainments referred to were not of a purely literary kind, still they were not for the purpose of making profit for any individual member of the Institution. On the contrary, whatever was obtained from the parties exhibiting, went to the promotion of the strictly literary and scientific object which the Institution had in view. Mr. Hannay asked if Mr. Dickens and his party went away without having a profit? That was a point to be considered. As no appeal had been lodged, and the time for lodging an appeal in the present charge was now gone by, the magistrates made an order for the amount, with costs.—*Nottingham Journal.*

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS AND PROTECTION ALLOWED.

### *From Gazette, 26th Nov.*, 1852.

*Dated 30th Oct.*

571. T. S. Bale and F. G. Sanders—Grinding clays for pottery.
585. J. Whitcomb and R. Smith—Manufacture of carpets.
587. J. Rock—Railway carriages.

*Dated 10th Nov.*

700. W. Johnson—Sewing-machinery.
702. J. T. Powell—Baking and drying biscuits and plastic materials.
704. L. G. Guerin—Improvements in fireplaces.

*Dated 11th Nov.*

705. R. H. Nicholls—Stopping railway carriages.
706. Ernst Luedeke—Motive power.
709. G. Lucas—Composition for filling engraved, cast, or sunk letters or ornaments, &c.
710. J. Noble—Improvements in combing wool, &c.
711. C. Mather and W. W. Platt—Machinery for finishing linen, &c.
712. C. Sharps—Breech-loading firearms.
713. H. Johnson—Machinery for sewing, stitching, &c.
714. H. Huart—Storing and preservation of grain.
715. J. C. Wyper—Ornamenting book-covers, &c.
717. W. Davis—Machinery for file-cutting.

*Dated 12th Nov.*

718. W. S. Middleton—Circular saw bench.
719. Sir C. Fox—Improvements in roads.
720. H. Fletcher—Electro-magnetism to motive power.
721. C. Bloomer—Anchors.
722. G. Kendall—Manufacture of mould candles.
723. D. Henwood—Registering number of persons enterin vehicles or other places.
724. C. Seaton—Metal tubes and apparatus, &c.
725. J. F Belleville—Generating steam.
726. J. H. Johnson—Reaping-machines.
727. J. H. Johnson—Measuring and registering flow of fluids.
728. G. Stenson—Apparatus for separating gold from earth.
729. T. Day—Landing, screening coals, &c.

*Dated 13th Nov.*

730. G. Philcox—Marine chronometers.
731. E. Davy—Preparation of flax and hemp.
733. J. Caborn—Threshing and dressing-machines.
734. A. Crestadoro—Rapid communications.
735. R. Lucas—Machinery for preparation of cotton, &c., for spinning.
736. S. Dear—Looms for weaving patterns, &c.
737. J. Paterson—Apparatus for shaping collars, &c.
738. R. & C. Coad—Improvements in fireplaces.
739. A. Hawkesworth—Life boats.
740. Earl Dundonald—Laying telegraph wires in earth.
741. S. Sedgwick—Lamps.
742. H. Greaves—Permanent way.
743. P. Forbes—Sowing seeds.

*Dated 15th Nov.*

744. G. D. & T. Edmeston—Steam engines and regulating water-wheels, and the like machinery.
745. J. Hogg—Glazed surfaces on paper, &c.
746. J. Cowen & T. Richardson—Sulphuric acid.
747. R. Reyburn—Lozenges, and other confections.
748. C. J. Dumery—Metal pipes or tubes, and apparatus, &c.
749. A. E. L Bellford—Apparatus for inhaling iodine.
750. J. Mirand—Electric telegraphs.
751. P. A. Le Comte de Fontainemoreau—Lamps.
752. G. Berry—Roasting coffee.
753. R. Sandiford—Block printing.
754. W. F. Rae—Gas heating and cooking.
755. J. Robertson—Manufacturer of casks, &c.
756. F. M. Jennings - Preparing flax, hemp, &c.
757. T. Taylor—Measuring fluids and motive power.
758. W. E. Newton—Knitting machinery.
759. A. Rogers—Apparatus for forming sewers, tunnels, &c.
760. J. D. Goodman—Boxes and axles of carriages.
761. S. Holt—Weaving cut-piled fabrics.
762. J. Burley—Apparatus to obtain a cut-pile surface.

*Dated 16th Nov.*

763. J. S. Edwards—Dessicating corn, &c.
764. T. Chrippes—Improvements in tilling land.
765. J. Johnson—Production of ornaments, brooches, boxes, &c., from a certain wood.
766. W. Marsden—Weaving.
768. J. W. Lea and W. Hunt—Utilizing waste heat of coke furnaces.
769. F. Vallée—Spinning and doubling flax, &c.
770. J. O'Keefe—Making watch-cases by machinery.

*Dated 17th Nov.*

771. J. T. Way and J. M. Payne—Burnt and fired ware.
773. H. Russell—Pianofortes.
775. P. A. L. C. Fontainemoreau—Weaving elastic tissues.
777. W. Watt—Weaving.

### *From Gazette, 30th Nov.*, 1852.

NO APPLICATIONS.

## WEEKLY LIST OF PATENTS SEALED.

A. E. L. Bellford—Improvements in the construction of springs for railway and other carriages. (A communication.) Six months, 25th Nov.

Moses Poole—Improvements in the elastic ribs, sticks, strips, and fillets used in the manufacture of umbrellas, parasols, and various other articles in substitution of whalebone and steel heretofore employed. (A communication.) Six months, 27th Nov.

Lewis Pocock—Improvements in rendering sea and other water pure. (A communication.) Six months, 27th Nov.

P. J. Lemaille—Certain improvements in the preservation of japanned leather. Six months, 1st Dec.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Nov. 26 | 3393 | Improved Winder for Boxes for String, Twine, &c. | Fred. Greer Yates | Winckworth-buildings, East-road, City-road. |
| „ „ | 3394 | A Mode of Connecting Flyers to Spindles | Thomas Fallows | Halshaw Moor, near Manchester. |
| „ 29 | 3395 | Despatch Boxes | Joseph Toulmin | 18, Sise-lane, Queen-street. |

# SOCIETY OF ARTS.

**FRIDAY, DECEMBER 10th, 1852.**

## THIRD ORDINARY MEETING,

### *Wednesday, December 8th,* 1852.

The third ordinary meeting of the Society was held on Wednesday, the 8th inst., J. S. Russell, F.R.S., in the chair.

The following were elected members:

Adams, Robert, Falkirk.
Allen, The Venerable Archdeacon, Shrewsbury.
Anderson, Sir Charles H. J., Bart., Lea Hall, Gainsborough.
Ashworth, Joseph, Pendleton.
Aspinall, John, 261, High Holborn.
Atkinson, John S., Rochester.
Banes, George Dann, H. M. Dockyard, Chatham.
Bannister, Joseph, 63, Coleshill-street, Eaton-square.
Barker, Thomas Herbert, M.D., Bedford.
Bayliff, Rev. Thomas, Bishops Stortford.
Belfast, the Rt. Hon. the Earl of, 29, St. James's-street.
Bird, James, 16, Orchard-street, Portman-square.
Bloomfield, J. B., Poole, Dorset.
Brewer, W., M.D., 21, George-street, Hanover-square.
Buckley, Major-General, New Hall, Salisbury.
Burton, Alfred, 36, Marina, St. Leonard's.
Bushell, Frederick William, Basingstoke.
Cartwright, Peplow, Oswestry.
Chance, Robert Lucas, West Bromwich.
Challinor, William, Leek.
Chesson, F. W., Brompton, Chatham, Kent.
Chubb, W. T., Fordingbridge.
Clutton, Rev. Ralph, Saffron Walden.
Coleman, Alfred, Bridgfield, Wandsworth.
Cromartie, M. W., Kensington.
Cunningham, James Mackey, M.D., Hailsham, Sussex.
Curwen, Rev. H., Workington.
Davis, Henry John, Newport, Monmouthshire.
Davis, Horatio, Mount Beacon House, Bath.
Denison, John Evelyn, M.P., 9, Stratton-street.
Dyson, Rev. H. J., Barking.
Fenton, Roger, 2, Albert-terrace, Albert-road, Regent's-park.
French, G. J., Bolton, Lancashire.
Gambier, Captain, Prince-town, Dartmoor.
Gill, Kennedy, Accrington.
Goddard, Samuel Palmer, Longton.
Harbin, George, Newton House, Yeovil.
Hawkes, Rev. Henry, B.A., F.L.S., Southsea.
Heys, Henry, Barrhead, near Glasgow.
Hitchin, James, Lincoln.
Hoffman, G. H., Margate.
Hope, Thomas Radford, Seaforth, near Liverpool.
Hutchison, Lieut. W., R.N., Saltash.
Hutson, Giles, Uxbridge.
Johnson, E. D., 21, Ashley-crescent, City-road.
Johnson, Henry, jun., Staleybridge.
Lacey, H. C., Richmond, Surrey.
Lloyd, Theodore, Leipsic-road, Camberwell.
Lucey, W. W., Marlborough.
Mackie, Samuel James, Folkstone.
Mason, A. J., 46, Argyle-square, New-road.
Miles, Philip W. S., Kingsweston, Bristol.
Montefiore, Nathaniel, 4, Great Stanhope-street.
Montgomery, James, Brentford.
Morris, David, M.P., 8, St. James-place.
Morrison, James, Commercial Bank, Stirling.
Nunnis, Paul, Walworth.
Norway, William King, Falmouth.
Overbury, Rev. F., Pershore.
Overton, Timothy, Horncastle.
Owen, Rev. Joseph Butterworth, Bilston.
Packe, C. W., M.P., 7, Richmond-terrace, Whitehall,
Panton, James, Wareham.
Parry, Thomas, Sleaford.
Patten, John Willson, M.P., 24, Hill-street.
Pickstone, William, Radcliffe-bridge, Lancashire.
Platt, James, Hartford Iron-works, Oldham.
Purvis, Prior, M.D. Greenwich.
Roberts, Henry, Jamaica.
Roche, James, Cork.
Rowe, R. R., Cambridge.
Sanctuary, Thomas, Horsham.
Scoones, Major Edward, Tunbridge.
Scott, Michael, Great George-street, Westminster.
Sharpe, Edmund, Lancaster.
Sillifant, John, Coombe, near Crediton.
Simpson, Rev. Robert, Skerton Parsonage, near Lancaster.
Smith, H. L., Southam.
Smith, John, Malton.
Smith, Rev. J. H., Leamington.
Smith, Thomas Cooper, 1, Cushion-court, Old Broad-street.
Smith, W. Wyke, Barnet.
Smithies, Joseph L., 4, Walbrook.
Sparkes, William, Crewkerne.
Spurrel, Flaxman, Bexley-heath.
Stephens, Henry, 34, Stamford-street.
Storey, Thomas, Lancaster.
Strickland, Hugh E., Tewkesbury.
Strong, Rev. W., Peterborough.
Swindells, George, Bollington, near Macclesfield.
Talfourd, the Hon. Sir T. N., 67, Russell-square.
Tartt, William M., Cheltenham.
Tait, Robert, 5, Queen Anne-street.
Thomson, Henry, Clitheroe.
Trent, E. W., Old Ford
Wales, the Rev. Chancellor, Northampton.

And the names of fifteen candidates for membership were read.

A paper by R. D. Hay, Esq., of Edinburgh, was read, on "the Geometrical Principles involved in the Construction of the Human Frame." In this paper, which to some extent may be considered as a continuation of the papers on the same subject already communicated by Mr. Hay to the Society, the Author proceeds to explain his theory of the natural principles of Beauty as developed in the Human Figure, and to reduce to geometrical principles certain simple and elementary conclusions; classing those angles which are found in the perfect human figure into groups. The chief object of the paper was to prove that the application of the "harmonious angles," thus derived, gives the key so long fruitlessly sought for, of the correct proportions of the human frame, both male and female, not only as regards dimensions, and the relative position of the centres of articulation, but also with relation to outline and contour. The paper was most fully illustrated by a very extensive series of carefully executed diagrams.

A vote of thanks to Mr. Hay was moved by the Rev. Dr. Booth, F.R.S., and seconded by D. Roberts, Esq., R.A. The Chairman announced that a paper on "Norton's Patent Register, for Time, Number, and Distance," would be read at the next meeting of the Society.

## GREAT EXHIBITION REPORT.

In the last Number, a notice was inserted respecting the "Surplus Report" of the Commissioners of the Great Exhibition. On Monday last it was announced in the House of Commons that 150,000*l.* of the Surplus Funds had been appropriated to the purchase of land at Kensington, and a vote of credit for an equal sum was passed by the House, to be applied for the further purchase of land in the same locality.

## PARLIAMENTARY PAPERS.

On Tuesday last, on the motion of the Rt. Hon. Mr. Tufnell, the House of Commons appointed a Select Committee to inquire into the expediency of distributing, gratis, under certain regulations, a selection from the Reports and Returns of the House of Commons, amongst Literary, Scientific, and Mechanics' Institutions throughout the United Kingdom.

## EXHIBITIONS OF NEW INVENTIONS.

In the year 1848, the Council of the Society of Arts commenced a series of annual Exhibitions of the Inventions of the preceding twelve months. The object which the Council had in view, was to afford facilities for ascertaining the direction in which inventive men were working, and to call attention to the importance of a permanent Museum of Inventions, which might serve as an historical record of the ingenuity of the age. Such a museum would also show what had been already accomplished in each separate branch of art or manufacture, and by a comparison of the efforts of various minds at different periods, would form the best ground-work and guide for future practice.

The first Exhibition, amongst many other things, served to illustrate, by an extensive series of instruments, the condition of Science as applied to electric telegraphs at that time. It also pointed out, by means of numerous models, the methods which had been suggested for improving the construction of the paddle-wheels of steam-vessels; and still more recently for superseding them by the application of the screw-propeller. Thus the actual condition of the two great desiderata of the day; the transmission of thought along lines of wire, and the extension of steam navigation were indicated, and progress was aided.

Encouraged by the success of this Exhibition, the Council deemed it expedient to continue the course thus commenced. The second Exhibition divided itself into the following classes: Railways and their mechanism—in which was comprised increased safety and economy in the construction of the permanent ways, and in the rolling-stock, especially in the fittings of the passenger-carriages, the axle-boxes, buffers, &c. Novelties in the form and principle of the pressure gauges, for steam and other engines, were also shown, and attracted considerable interest. Attention was likewise directed to contrivances connected with gas and water supply—important branches of town engineering. Meters of various kinds were exhibited in operation, so that their relative merits were capable of being tested by ocular demonstration. Looms and spinning-machinery also formed part of the collection.

About this period, the various novel appliances of magnetism began to excite considerable public attention, and many interesting magnetic machines were exhibited; whilst many novel contrivances for improving the sanitary condition and increasing the domestic comfort of the humbler classes were pointed out.

Still later collections have called attention to improvements in the steam engine, and machinery generally; more particularly to agricultural and horticultural implements, and the application of steam power to those machines.

In 1851, the Great Exhibition obtained for Inventors protection from pillage, by a cheaper and less tedious process than formerly—provisional registration.

The Exhibition of that year displayed an entirely novel feature—the protection of inventions relating to the manufacture of, and designs for, articles of dress. Thus trowsers, jackets, and under-clothing of all kinds, manufactured in the loom without seams, were shown; articles which it was believed would be found to possess equal durability at less cost than those usually made; and though not, perhaps, so commendable in point of appearance, yet offer great inducements to the emigrant and labourer.

It will be seen that these Exhibitions have served to record, as it was designed they should, the leading features of the inventions of the day, and the facilities afforded by the law for protecting the interests both of the employer and of the employed. With a strong conviction of the great utility of these annual Exhibitions, the Council are now engaged in arranging, and propose to open in the ensuing week an Exhibition of the inventions of the past twelve months, which it will be our duty to describe more in detail in our succeeding numbers. It may suffice for the present to say that the forthcoming collection will possess many points of interest, and will include models of several machines, having for their object the facilitating washing of earth in the gold districts. At the same time it may safely be predicted, that under the new Patent Laws which have been in operation since October last, and have already afforded protection to nearly 800 inventions, future Exhibitions will continue to increase, not only in interest, but also in extent.

## LIST OF SUBJECTS FOR PREMIUMS.

In publishing the List of Subjects for Premiums for the Session 1852-3, the Council desire to indicate some of those subjects of inquiry which are considered as peculiarly deserving of attention, and for which therefore they offer premiums. The object of the Society has always been to encourage useful inventions, and communications relating to any department of Arts, Manufactures, or Commerce, are received and always meet with due attention; a premium or other reward being given in those cases where the communication is deemed of sufficient value or importance. In the following List of Subjects, which includes the first division of the Prize List, each article is followed by a brief note intended to explain more in detail, the object proposed in offering the premium:

### CLASSES I. TO IV.—RAW MATERIALS.

1. For the best essay on Salt; the sources from whence it is obtained, and the processes involved in its manufacture.

Great improvements have been introduced in the processes of evaporation and purification; the salt of certain districts is known to be peculiarly suitable for special purposes; extensive beds of rock salt have been recently discovered.

2. For the best essay on Iron Ore, and the Manufacture of Iron, as carried on in different districts and countries; especially contrasting the Iron-manufacture of England with that of America and the Continent of Europe.

Much is to be learnt by comparing together the processes adopted in the iron-works of different countries. A good and accurate account of the chemical, mechanical, and statistical results of iron-making, in various parts of the world, would be a work of the greatest practical value. American iron has been asserted to be superior, for many purposes, to that produced in England. Supposing this to be the case, it is desirable that we should know whether this is to be attributed to a superior method of manipulation, or whether it is not rather due to the nature of the materials used in reducing the ore.

3. For a cheap and efficient mode of extracting the metal from the Iron Sand (Tennaka) of New Zealand.

This sand, which is very abundant, and is said to contain 80 per cent. of metal, has not hitherto been economically reduced.

4. For the invention of any White Metallic Alloy, free from microscopic faults, which may be successfully applied to the Arts, is hard enough for use in reflecting telescopes, and is not liable to be acted upon by the atmosphere.

This is a desideratum, for nearly all the good alloys at present known, suitable for such purposes, are very prone to tarnish when exposed to the air.

5. For the discovery in England, or the importation from any of the British Possessions, of Plumbago, or of some other substance which may be used in lieu thereof, equal in quality to that now obtained from Cumberland.

The use of plumbago is greatly on the increase, whilst the supply appears rather to diminish.

6. For the discovery of a New Fuel, which shall occupy less space, and be of less weight than any now in use, without diminution in the amount of heating power, or liability to injure metals in contact with it.

This is a point of the utmost importance for marine navigation, the extension of which is at present much limited by the great bulk and weight of coal required to be carried. For long voyages the necessity of calling at various stations to "coal"—coal sent out from this country at a vast expense—causes great delay, which is of serious consequence with mail-steamers.

7. For an account of the processes involved in the preparation of Charcoal, and its recent applications to manufacturing and other purposes.

The comparison of wood, coal, and peat charcoal, as regards modes of manufacture, cost, and practical uses, would be valuable. Charcoal is now extensively used as a filtering, purifying, and deodorizing agent.

8. For the best essay on the Chemical Composition of Rocks—the changes which they have undergone, and are now undergoing; especially in relation to those which are used for building and other similar purposes.

There are many chemical and geological points connected with the structure of stone, with which our builders are unacquainted, and a knowledge of which would tend to render stone buildings less liable to perish from atmospheric influences than they now are.

9. For the best essay on the Nature, Composition, Properties, Geological Distribution, and Working of Flag, Slate, and other Stones used for Paving.

Recently Welsh flag slate stones have been introduced for paving, and other purposes, which are stated to possess many advantages in point of durability and economy.

10. For the best essay on the Nature and Properties of Granite; on the relative qualities of the material obtained from quarries in England, Scotland, Ireland, and the Channel Islands; and their comparative fitness for Architectural and Engineering purposes.

There are various positions in which one kind of stone is superior to another, though it may not be equally useful for all purposes; it is therefore desirable that we should know which kind may be most advantageously applied in any particular structure, or part of a structure.

11. For an account of a new method of making Sulphuric Acid, which shall be equally efficient with that at present employed, and which shall not require the large leaden chambers now in use.

The many purposes for which sulphuric acid is now employed in the Arts, renders it most desirable to do away with the very cumbrous and expensive "plant" at present necessary.

12. For an account of the manufacture of pure Hydrochloric Acid, free from all metallic impurities.

Pure hydro-chloric acid is now becoming a most important agent; a good and simple process for obtaining it is therefore desirable.

13. For the production of a bright Blue Colour, applicable to the manufacture of Papier Maché, and not liable to be affected by the atmosphere.

There is no known blue suitable for this purpose. Ultramarine is a body colour of an oily nature, and therefore not well-adapted to this particular manufacture.

14. For an account of the manufacture of pure Potash and Soda, free from earthy impurities, as re-agents for the use of Chemists.

Chemists are well aware of the extreme difficulty of obtaining the pure fixed alkalies; they are hardly to be met with in trade.

15. For an account of the economic manufacture of Oxide of Zinc, and its incorporation with other colours, so as to render them not liable to be acted upon by sulphurous gases, or to fade on exposure to the light and heat.

The discrepancy in the opinions entertained by practical men as to the value of this substance, and its effect on the health of workmen, renders this a most interesting question for discussion. Good specimens of colours prepared and rendered permanent, in combination with the oxide of zinc, were exhibited at the Great Exhibition.

16. For the importation of not less than half a ton of well-dried Plantains, or Bananas from the West Indies.

The fruit of the Plantain, when dried, somewhat resembles the fig; it is wholesome, has an agreeable flavour, and is not liable to suffer from the attack of insects.

17. For the importation from any British Possession, of not less than one hundred pounds of Dried Fruits, of equal quality with those now imported from the Mediterranean.

Good samples of dried fruits have been received from Australia, but hitherto not in sufficient quantities to constitute them an article of commerce.

18. For the importation of not less than one pipe of Wine, of good marketable quality, made from the produce of Vineyards in Australasia.

Light wines of promising quality were recently imported from Australian vineyards, but in their then condition they were not adapted to the English market.

19. For the best essay on the theory and practice of Fermentation, particularly as applied to the Art of Brewing; so as to modify, or altogether dispense with the intermediate process of malting.

Though this subject has engaged the attention of our ablest scientific men, it would seem that their investigations have not yet had much effect on the manufactures in which fermentation is one of the principal elements. On the other hand, practical men assert that nothing which has yet been propounded offers a sufficient explanation of the causes in operation, or constitutes a true guide in practice.

20. For an account of the processes employed in the manufacture of Starch,—the sources from whence it is obtained, and the purposes to which it is applied.

Starch has, of late years, been produced from various new sources—such as rice, Indian corn, sago, plantain meal, potato, fern, &c. It has also been obtained by alcoholic saturation in place of the old process of fermentation.

21. For a method of preparing an Engine Size for the use of Paper-makers, superior to any now in use.

By the present processes of animal-sizing machine-made papers, unequal surfaces are frequently produced.

22. For the importation of any New Substance which can be successfully used as a substitute for Caoutchouc.

Amongst the milky-juiced plants of tropical countries there are doubtless some affording substances analogous to caoutchouc; the many and increasing uses of that material render substitutes for it, as well as new sources of supply, very desirable.

23. For the importation from China, India, or elsewhere, of any new Vegetable Oils or Fatty Substances, which can be used as food, or are applicable to manufacturing purposes.

Any new oils, particularly those which are solid at the common temperature (60° Fahrenheit) would be of great value.

24. For the importation of not less than ten gallons of Olive Oil, the produce of Australasia, or any other British Possession.

The samples of Australian oil sent over are excellent; but as yet it has not become, to any extent, an article of trade.

25. For the production of Oil and other Substances from the Cotton-seed, and the application of the refuse material to agricultural or manufacturing purposes.

Cotton-seed oil has, for some time, been largely manufactured in the South of France and elsewhere. The cake forms a valuable food for cattle.

26. For a method of refining Vegetable Oils, by a quick and cheap process, so as to render them fit for burning in lamps, and for lubricating machinery.

None of the modes at present employed for this purpose are, in all respects, satisfactory, or to be depended upon. A good and simple mechanical means of refining oil is much needed.

27. For any Unguent suitable for lubricating machinery; with an account of the substances at present employed for that purpose, and from whence derived.

The large demand which has been created by the increased use of machinery in all manufacturing processes, and the mechanism connected with locomotion, renders this, though comparatively a new article of commerce, one of great importance. It should not be liable to solidify by heat, and should be a good anti-friction agent.

28. For improvements in the manipulation of Bees'-wax, so as to render it applicable to new purposes in art or manufacture.

It is believed, that if the comb was made use of previous to being charged with the impurities and discolouring matter due to the honey, it might be made more extensively useful in the Arts.

29. For a cheap and efficient means of extracting Dyes from Dye-woods and other substances.

By the old processes, upwards of 10 per cent. of colouring matter is said to be lost.

30. For the importation of not less than one ton of the Galium Tinctorium from Canada.

This root is stated to yield a very fine flesh lake. Although imported into this country many years since, it has not yet become an article of commerce. This may, perhaps, be due to a deficiency in the mechanism for extracting the colour, or possibly to an ignorance as to the value of the root on the part of the natives themselves.

31. For an account of improvements in Dyeing Turkey Red, by which the time required to produce a fast and brilliant colour may be reduced.

At present, a tedious and dirty process, which has been the subject of few, if any, improvements for many years past.

32. For the best samples of Cotton from the South African Colonies.

Excellent samples of cotton have been received from Port Natal; the staple was very good, but it was injured by bad handling.

33. For the best samples of Cotton from the Western Coast of Africa.

The unhealthiness of the climate of these parts renders the cultivation of cotton, which is indigenous to the soil, a matter of impossibility by Europeans. A simple means of cultivating and preparing the cotton for the market, within the comprehension of the natives, is therefore very desirable.

34. For the most successful Cultivation of Flax, in British India or Australasia.

35. For an essay on the Flax Plants of India; the purposes to which they are at present applied, and the best means of employing the refuse material.

Large quantities of the flax plant are annually grown in India for the seed alone. The only use to which the fibre is applied is that of making fishing-lines.

36. For the importation of at least two tons of any Vegetable Fibre, applicable to all the purposes for which Hemp is now used, and equally cheap, strong, and durable.

37. For the best sample of any new Ornamental Wood, suitable for the manufacture of furniture.

New Zealand has already furnished some excellent specimens of woods, which have been applied successfully for this purpose. The vast, unexplored tracts of Australasia and Canada give promise, from what we already know of them, that many valuable woods may also be obtained from those quarters.

38. For the introduction of a cheap and efficient substitute for Alpaca Wool.

Owing to the large demand for this article of late years, and the comparatively limited sources of supply, it is essential that a cheap and good substitute should be introduced.

39. For the importation, from any British Possession, of not less than one hundred pounds of Silk proper for manufactures.

40. For the importation, from the East Indies, of Silk equal in quality to the best Italian, or China Silk.

Great improvements have recently been effected in the winding and dressing of Bengal silks. They are still, however, harsh and inferior in comparison with Italian silks.

## OFFICIAL RETURNS OF FOREIGN AND COLONIAL POSTAGE.

The following returns, of great value at the present time, when public attention is directed to the establishment of a Uniform Penny rate to our Colonies, have been courteously furnished to the Postage Association, by direction of the Postmaster-general. This act, and the communications with the Foreign and Colonial Offices, marks a new era in correspondence with public offices, and will be duly appreciated.

General Post Office,
15th November, 1852.

Sir,—Your letter of the 9th inst. having been laid before the Postmaster-general, I am directed by his Lordship to forward in reply, for the information of the Council of the Colonial and International Postage Association, the enclosed copy of the Estimate of Foreign and Colonial Postage for 1848 (the latest that has been prepared), adding that the increase in the Foreign and Colonial correspondence since that period is probably not very different from that in the number of letters in the United Kingdom generally, viz., 15 per cent.

I am, Sir, your obedient servant,
ROWLAND HILL.

G. W. Yapp, Esq., &c.,
18, John-street, Adelphi.

### RETURN SHOWING THE ESTIMATED GROSS AMOUNT OF FOREIGN AND COLONIAL POSTAGE FOR THE YEAR ENDED 5TH JAN., 1849.

(*Distinguishing the earnings of each line of Packets.*)

| MAILS. | GROSS POSTAGE. (*Transmarine Postage only.*) | |
|---|---|---|
| | £ | £ |
| FRENCH: | | |
| France and Algeria | 37,466 | |
| Turkey, Levant, &c | 13,742 | |
| Sardinia and Southern Italy | 9,536 | |
| Spain and Portugal | 5,758 | |
| Mediterranean | 6,799 | |
| British Colonies, &c. | 16,016 | |
| Ship | 271 | |
| | 89,588 | |
| Deduct amount repayable to France | 35,614 | |
| | | 53,974 |
| BELGIAN: | | |
| Belgium | 10,669 | |
| Germany | 594 | |
| British Colonies, &c | 630 | |
| Ship | 28 | |
| | 11,921 | |
| Deduct amount repayable to Belgium | 2,752 | |
| | | 9,169 |
| PRUSSIAN (*including Bremen closed mail*): | | |
| Prussia | 16,180 | |
| Transit | 20,022 | |
| British Colonies, &c | 1,636 | |
| Ship | 147 | |
| | 37,985 | |
| Deduct amount repayable to Prussia and Belgium | 22,646 | |
| | | 15,339 |
| DUTCH: | | |
| Holland | 6,995 | |
| Germany | 44 | |
| British Colonies, &c. | 766 | |
| Ship | 36 | |
| | 7,841 | |
| Deduct amount repayable to Holland | 1,368 | |
| | | 6,473 |
| HAMBURG AND NORTH OF EUROPE: | | |
| Hamburg | 9,536 | |
| North of Europe | 4,577 | |
| British Colonies, &c. | 1,548 | |
| Ship | 199 | |
| | 15,860 | |
| Deduct amount repayable to Hamburg | 3,628 | |
| | | 12,232 |
| AMERICAN: | | |
| British North America | 33,237 | |
| United States | 64,531 | |
| Continental Letters, &c | 12,062 | |
| | | 109,830 |
| WEST INDIA: | | |
| British West Indies | 23,884 | |
| Foreign West Indies | 16,794 | |
| Continental Letters, &c | 10,997 | |
| | 51,675 | |
| Add for conveying French Mail to and from Chagres | 416 | |
| | | 52,091 |
| Carried over | | 259,108 |
| Brought over | £259,108 | £ |
| CAPE, &c.: | | |
| H.M. Ships, Cape of Good Hope, &c. | 5,115 | |
| | | 5,115 |
| PENINSULAR: | | |
| Gibraltar | 3,627 | |
| Spain | 2,430 | |
| Portugal | 5,893 | |
| Continental Letters, &c. | 906 | |
| | | 12,856 |
| INDIA (*viâ* Southampton): | | |
| India | 42,047 | |
| Gibraltar | 558 | |
| Mediterranean | 6,312 | |
| | 48,917 | |
| Add for conveying Dutch Closed Mail | 209 | |
| | 49,126 | |
| Deduct Amount allowed to the East India Company, by order of the Treasury | 21,658 | |
| | | 27,468 |
| INDIA (*viâ* Marseilles): | | |
| India | 36,413 | |
| Mediterranean | 3,559 | |
| | 39,972 | |
| Add for conveying French India Mail | 1,169 | |
| | 41,641 | |
| Deduct Amount due to the French Office for conveyance through France | 11,193 | |
| | | 30,448 |
| BRAZIL: | | |
| Brazil | 12,884 | |
| Continental Letters, &c. | 2,753 | |
| | | 15,637 |
| SYDNEY: | | |
| Sydney | 5,730 | |
| Continental Letters, &c | 487 | |
| | | 6,217 |
| AFRICAN: | | |
| Sierra Leone | 383 | |
| | | 383 |
| SHIP: | | |
| Ship Letters | 35,827 | |
| Continental Newspapers | 16 | |
| | | 35,843 |
| Amount of Inter-colonial Packet Postage, collected in the East and West Indies, British North America, and China, for the year ended 5th April, 1848 | 13,169 | |
| | | 13,169 |
| Amount of Inter-colonial Packet Postage, collected by the Agents at Alexandria, Malta, and Gibraltar, for the year ended 5th Jan., 1849 | 1,847 | |
| | | 1,847 |
| Red Sea Postage, collected at Bombay, Madras, Calcutta, Ceylon, Suez, and Hong Kong, for the year ended 5th April, 1848 | 6,405 | |
| | | 6,405 |
| Postage collected by Agents at Foreign Ports, for Paid Letters and Newspapers, from one Foreign Port to another, for the year ended 5th April, 1848 | 4,816 | |
| | | 4,816 |
| Postage collected by the French Office, upon Correspondence between Malta, Alexandria, and France, and the French Offices in the Mediterranean, to the 5th Jan., 1849 | 931 | |
| Carried over | | 419,312 |

| MAILS. | GROSS POSTAGE. (*Transmarine Postage only.*) £ | £ |
|---|---|---|
| Brought over ........... |  | 419,312 |
| Postage collected by the Agents at Malta and Alexandria, upon the like Correspondence, for the same period .......... | 866 |  |
|  | 1,797 |  |
| Deduct Amount repayable to France | 392 |  |
|  |  | 1,405 |
| Total .......... |  | 420,717 |
| Deduct for Dead Letters .......... |  | 14,819 |
|  |  | £405,898 |
| *Colonial Inland Postage.* |  |  |
| Amount of Colonial Inland Rates, deducted from the Gross Receipts of the American and West India Mails above .......... | 10,996 |  |
| Deduct for Dead Letters ... | 313 |  |
|  |  | 10,683 |
| Amount of Internal Postage collected in British North America and Jamaica, for the year ended 5th April, 1848 (exclusive of the above £10,996) .......... | 84,840 |  |
| Deduct for Dead Letters ... | 2,417 |  |
|  |  | 82,423 |
|  |  | £499,004 |

*Note.*—The sum of £69,417 has been deducted from the gross receipts of the several Mails, as the amount representing the British Inland Rate upon Foreign and Colonial Letters, as directed by the Postmaster-General's Minute of March 17th, 1849.

The Government Transmarine Postage (£67,256) is included in the above amount of £499,004.

General Post-office,
*August 1st*, 1849.

Signed, { F. W. Herbert,
R. Z. Beechcroft.

## LOCAL MUSEUMS.

A circular was sent to the Institutions in union, some months since, on the interchange of specimens, as a means of assisting in the formation of local museums. It was suggested that in almost every place specimens in illustration of local manufactures, or particular branches of natural history, might be collected; and that by a systematic exchange of these amongst various Institutions, a number of very useful little museums might be formed at a comparatively trifling expense. This proposition was very well received by a number of Institutions, and though in some cases want of house-room, and in others want of funds, were mentioned as obstacles, yet in the large majority of Institutions the plan of co-operation met with decided approval and support.

A second circular, intended to explain still further the mode in which it was proposed to carry out this system of collection and exchange, was issued at the beginning of September, and those institutions which were willing to adopt it were invited to state the nature and extent of the local collections they were willing to prepare. In this circular it was pointed out that the specimens need not be large, and that, in fact, a moderate-sized cabinet, or chest of drawers, would suffice to contain a very numerous collection. Two principal objects were contemplated in sending out these circulars, the one being to show how both trouble and expense might be saved to all by mutual co-operation; and the other, the practical improvement of local museums. Many Institutions have large collections of curious and interesting articles, but very few indeed have useful museums.

A museum, properly considered, is not a collection of curiosities, monstrosities, antiquities, and artistic works, grouped together in glass-cases, in a species of native confusion; but if it deserves its name, is a place in which instruction is to be gained, and consequently in which order, arrangement, and method, is evident throughout. Arrangement in a museum is of the very first consequence; without it the specimens, however good, are isolated, and tend only to confuse, whilst when well arranged, and according to some kind of order, they at once become instructive and suggestive; so that even a careless observer cannot fail to learn something from their examination. Collections may be formed in illustration of various subjects, and for many different purposes; they may be made to indicate the several branches of natural science,—such as Geology, Mineralogy, Botany, Zoology, Entomology, etc.; they may be formed to illustrate the mechanical arts and manufactures; they may be Historical, and designed to show the progressive development of the human race; or Ethnological, illustrating the habits and customs of particular people; excellent artistic collections too may be made, in which beautiful forms, and appropriate combinations of colour, are shown, so as insensibly to educate the eye to the appreciation of the true principles of taste: but in these, and in all similar cases, the collections lose their chief value if they are not well arranged; the systematic and consecutive arrangement constituting an essential feature in all really instructive museums. A geological collection, for example, in which specimens of the various strata of the earth are arranged in the same order as that in which they naturally occur, and each one accompanied by its own peculiar organic remains, and the mineral productions, or metallic ores occurring in it, is highly instructive; but if we add to it good geological maps, and illustrations of the uses in the arts to which those ores and stones are applied, its value is very greatly increased.

It may be said that all this involves great trouble and expense,—and so no doubt it must, on a large scale; in the present proposition it is not at all contemplated to form museums, but merely to form a number of little local collections; bearing in mind, however, that the value of the specimens so brought together depends almost entirely on the manner in which they are selected, and on their being afterwards arranged and shown in a connected and *suggestive* manner. The following list, which includes those Institutions which have expressed a desire to exchange local collections, is at present by no means complete, but it is thought better to publish it in its present state, and to request that any additions or alterations which are desired may be communicated with as little delay as possible.

1. **Bacup.**—A. Illustrations of the various stages of the cotton manufacture, from the raw materials to the

finished article. B. Collections in illustration of the geology of the district.

2. Bexley Heath.—Illustrations of the geology of the chalk measures.

3. Bilston.—Illustrations of the geology of the Staffordshire coal-fields, and of the manufacture of iron, including specimens of the various ores and raw materials, and samples of the metal obtained, so as to show the various stages of the process.

4. Bootle.—Specimens in illustration of the manufacture of bricks, and common tiles.

5. Bridgwater.—A. Specimen of the entire series of the rock formations of the county, with selections of organic remains. B. Specimens in illustration of the manufacture of Bath-brick and scouring-brick.

6. Burnley.—A. Illustrations of the geology of the district, including fossil remains. B. Some botanical collections. C. Illustrations of cotton manufacture.

7. Cardiff.—Specimens of steam-coal.

8. Cupar Angus.—Specimens in illustration of the manufacture of flax; from the raw material, as pulled, to the finest finished linen.

9. Dundalk.—A. Illustrations of the flax manufacture. B. Illustrations of the art of tanning. C. Specimens in illustration of the geology of the surrounding district.

10. Isle of Wight.—Collections in illustration of the geology of the fresh-water formations of the Isle of Wight.

11. Manchester.—Collections in illustration of the cotton manufacture in its various branches, especially in relation to spinning, weaving, and printing.

12. Macclesfield.—Illustrations of the silk manufacture; beginning with the raw article, and showing the various operations through which it passes, and the processes to which it is subjected.

13. Margate.—Illustrations of the geology of the chalk measures, including specimens of the leading chalk fossils.

14. Merthyr Tydvil.—Collections in illustration of the manufacture of iron, as carried on in South Wales.

15. Morpeth.—Illustrations of the geology and botany of the district.

16. Newark.—Geological specimens, including samples of plaster-stone, illustrating the manufacture of plaster of Paris, and its uses in the arts; fossil shells, and other organic remains.

17. Newbury.—Samples of wool, selected so as to show the various qualities, and the points of chief importance in connection with the wool trade.

18. Northampton.—Collections in illustration of the coleoptera of the county; each collection to contain from 200 to 250 species (carefully named), and averaging 500 specimens.

19. Oulton.—Illustrations of the flax manufacture.

20. Portsea.

21. Princetown.—A. Specimens in illustration of the production of flax in Devonshire. B. Collections in illustration of the botanical, geological, and other natural productions of Dartmoor. C. Collections of the metallic ores raised in the district; arranged so as to show the operations to which they are subjected.

22. St. Just.—A. Collections in illustration of the geology of the western districts of Cornwall. B. Collections in illustration of the entomology of the district.

23. Shelton (Staffordshire).—Specimens of the various materials used in the manufacture of earthenware and china, together with specimens of the manufactured article in every stage of its progress, from the first rude form, to the state in which it is sent to market.

24. Stamford.—Geological collections in illustration of the geology of the district, including organic remains, as well as specimens of those strata which are worked for economical purposes,

25. Stoke-on-Trent.—Specimens of the raw materials used in the manufacture and ornamentation of china; accompanied by illustrations of the manufacture in its different stages

26. Tonbridge.—Illustrations of the manufacture of "Tonbridge-ware," in all its stages. Collections of umbelliferous plants from the neighbourhood of Tonbridge, botanically arranged, and accompanied by drawings, or dissected specimens, so displayed as to exhibit the structure of the seeds, and other physiological peculiarities; with a tabular view of the whole order.

27. Whitehaven.—A. Collections in illustration of the geology and mining products of the district. B. Collections of algæ from the coast of Cumberland. C. Illustrations of the manufacture of rope and cordage, showing the stages of the process. D. Similar collections in illustration of the manufacture of paper.

28. Worcester.—Collections in illustration of the geology of the neighbourhood.

## HOME CORRESPONDENCE.

### LECTURES.

Sir,—With much interest and pleasure I have read over the first two Numbers of the Journal of the Society of Arts. Such a publication, if conducted with judgment and energy, may be made to meet a want which is becoming every day more felt; I refer to the growing necessity of some medium of communication between individuals and societies bound by a common sympathy, and united in the great object,—however they may differ as to the means,—of promoting education and useful instruction. Permit me to use your Journal to convey my humble opinion, that your Council or Institute's Committee, or whatever body may have the management of the Institute's movement, are unprofitably expending much ill-directed energy and misspent zeal in a fruitless attempt to put life into the dry bones of a worn-out system, which for the last twenty years has been in operation, and is now fast dying out. It has been tried, and found wanting. It does not meet the requirements of the day. Men now want the realities of knowledge; they will no longer be content with shams and make-believes. But enough of this. Why do the Council not attempt to grapple with the real difficulties of popular instruction? Why do they not organize some plan by which they might convert the Mechanics' Institutions into People's Colleges, like Sheffield People's College. This would be an object worthy of the Society of Arts, and of the great union which has been formed under its auspices. I do not mean that the local control or self-government of these Institutions should be interfered with, but a great advantage would be gained if they could all be induced to combine under some well-digested scheme. It is quite plain,—so plain as not to need illustration,—that the Institutions in their collective capacity could secure, at a small cost, advantages which even the most wealthy, in their present isolated position, can with difficulty obtain,—I refer to models, casts, diagrams, class-teachers, cheap editions of standard books, &c., &c.

The Society of Arts might, if the scheme were comprehensively worked out, appoint examiners, who should hold examinations at stated times, and issue certificates of different orders of merit. I will not, on the present occasion, trespass further on your pages. My object is rather to elicit the views of your correspondents on this question than to enforce my own. With your kind permission, I shall again return to this subject.

Y. Z., President of an Institution.

### TAXES.

Sir,—Many Institutions have long struggled on with limited funds, but the very means which the Legislature has kindly devised to assist them, often, through legal quibbling, are rendered inapplicable,—I allude to the Act which was intended to afford to Institutions, established for the promotion of literature, science, and art, freedom from the payment of rates. This is no slight assistance, for the few pounds thus annually saved would frequently enable an Institution to work on until more prosperous days. There is no doubt the Legislature intended to assist such Institutions as are comprised in our Union, but unfortunately in every town parties may be found opposed to their progress; and more unfortunately still, professional men too are at hand ready to lend their subtleties for the same purpose. It is in vain we go to the expense of certificates from barristers, have the rules registered and confirmed at quarter sessions, and pass through the various requirements of the Act, the measure is so deficient that there is not an Institution in the country but may be deprived of its beneficial operations. Let us, therefore, unite; and may the voices of our 90,000 members in petition procure a measure which will be received with gratitude by many a small Institution, and which will confirm to us that which the beneficence and wisdom of Parliament intended for our benefit. W. T. J.

### BYE-LAWS.

Sir,—The Committee of our Institution are now engaged in drawing up a code of laws and regulations for our future management. Can you assist us with a copy of the rules of any other established society? We should be very glad to profit by the experience of older Institutions; and I would suggest that the Society of Arts might render valuable assistance in this, and similar cases, by collecting copies of the rules of some of the best managed Institutions, and binding them into a volume, which might subsequently be lent to the Committee of any Institution desirous of drawing up or amending similar bye-laws. P. S.

### GREAT EXHIBITION.

——— Mechanics' Institution, Dec. 7, 1852.

Sir,—Some time ago we applied to the Royal Commissioners of the Great Exhibition for a copy of the Illustrated Catalogue and Jury Reports, for the use of the members of our Institution; to which we received a reply, stating that no grants of the kind to institutions like ours had been made, but that the application had been placed on record, and if at any subsequent time the Commissioners should determine to make such grants, our application should not be overlooked. Probably if the Special Committee of the Associated Institutes were to incite the various Institutions throughout the country (as in the case of Parliamentary Reports) to make similar applications, or if they were themselves, aided by the Council of the Society of Arts, to make a similar application on behalf of the associated and other kindred institutions, success might probably attend the application, which would confer a boon on ours and other similarly poor Institutions. Your obedient servant,

J. H.

## REPORTS OF INSTITUTIONS.

### REIGATE MECHANICS' INSTITUTION.

The Fifteenth Annual Report of this Institution has just been published, from which it appears that, during the past year, fourteen Lectures have been delivered on various subjects, chiefly literary. The Library, which now numbers upwards of 1,100 volumes, has also received valuable accessions. The Treasurer's statement of accounts shows that the

| | | | |
|---|---|---|---|
| Receipts have been . . . . | £112 | 3s. | 5d. |
| Payments . . . . . . . . | 111 | 1 | 6 |
| Leaving a balance of . . | £1 | 1 | 11 |

We extract the following paragraph entire:

"The Committee beg to offer their congratulations on this Institution being received into union by the Society for the encouragement of Arts, Manufactures, and Commerce, whereby several advantages have already accrued. Not only will a knowledge of all the newest improvements and inventions in the Arts and Sciences be immediately received from this source, but the Institution will be entitled to receive the Reports and Transactions of the Society of Arts, of which several volumes have already been received, together with a box of colours and pencils for drawing, with a small box of mathematical instruments of unexampled cheapness—namely, a shilling for the box of colours, and half-a-crown for every box of instruments. Also, at the request of that Society, they have received, as issued from the Privy Council-office, a series of thirteen volumes of Reports from the Inspectors of Schools to the Committee of Lords of the Privy Council for Education, which reports are in the highest degree interesting to all who take an interest in the all-important subject of popular education. This friendly connection with the Society of Arts, therefore, your Committee considers to be a subject of peculiar felicitation."

### MUCH WENLOCK AGRICULTURAL READING SOCIETY.

The eleventh annual meeting of this Society was held on the 30th ult.

The Report stated that:

"The means of acquiring useful knowledge have been, of late years, greatly augmented in our chief towns, and even in not a few places of minor importance; but much remains to be done, especially in our small towns, and in agricultural districts. * * * There are many persons in these districts yet far behind the intelligence of the age, chiefly because the means of information have not been extended to them, or the value and importance of progress in knowledge fairly set before them. * * * Agriculture now, more than ever, calls for mental progress; and the extension of knowledge among the cultivators of the soil is not only essential to their own welfare, but to the prosperity and security of the nation of which they form so large and important a part. To aid in the extension of useful knowledge, amongst this class in particular, this Society was formed. * * * Your Committee has the pleasure to report the near approach to completion of a large and handsome room for lectures or public meetings, with an additional room for a library, and a house for the Librarian. The cost of the building when complete will be 800*l.*, of which 60*l.* still remains to be subscribed. * * * During the year 112 volumes have been added to the library; and a collection of forty-one specimens of fossils from the Madeley mining district, to the museum."

## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

**Royal Society.** Nov. 30.—The Anniversary Meeting was held this day, the Earl of Rosse, President, in the chair. His Lordship delivered his annual address, passing under review the state and prospects of science. The Medals were then awarded, as follows: The Copley Medal to Baron Humboldt, for his eminent services in Terrestrial Physics. This medal was received for the Baron by Chevalier Bunsen, who, in a long and eloquent address, returned the thanks of Baron Humboldt for the high honour paid him by the Society. The Rumford Medal was awarded to Professor Stokes, of Cambridge, for his very remarkable discovery of the "Change in the Refrangibility of Light." One of the Royal Medals was awarded to Mr. Joule, for his paper on the "Mechanical Equivalent of Heat," printed in the *Transactions*; and the second Royal Medal to Mr. Huxley, for his valuable papers on the "Anatomy and Affinities of the Family of the Medusæ." The election of Council and Officers for the ensuing year was then proceeded with, when the following noblemen and gentlemen were declared to be elected:

*President:* The Earl of Rosse.—*Treasurer:* Colonel Sabine.—*Secretaries:* S. H. Christie, and T. Bell, Esqs.—*Foreign Secretary:* Captain W. H. Smyth, R.N.—*Other Members of the Council: Rev. J. Booth, LL.D.*; B. C. Brodie, Esq.; C. Brooke, Esq.; *Lord Enniskillen*; J. P. Gassiot, Esq.; *T. Graham, Esq.*; *Dr. J. D. Hooker*; *W. Hopkins, Esq.*; *H. B. Jones, M.D.*; *G. Newport, Esq.*; Lieut.-Colonel Portlock, R.E.; *J. M. Rendel, Esq.*; *Dr. W. Sharpey*; W. Spence, Esq.; Dr. N. Wallich; and *Lord Wrottesley.*

The names in *Italics* are those of the new Members.

**Zoological Society of London.** Dec. 2.—At the Monthly Meeting held at the Society's house in Hanover-square, Mr. Broderip, Vice-president, in the chair, his Excellency the Count Colloredo, the Countess Colloredo, Hon. T. L. Powys, and Messrs. J. E. Cole, S. C. Lakemann, G. Whateley, and F. Cramp, were elected Fellows. The Report from the Council stated, that notwithstanding the long-continued wet weather, the collection of living animals was in a remarkably healthy condition, and that several donations had been received during the last month, in which the number of visitors presented a considerable increase as compared with the month of November, 1851.

## PROCEEDINGS OF INSTITUTIONS.

**Basingstoke.**—The members of the Mutual Improvement Association were last week favoured with a talented and highly interesting Lecture on "Chivalry and Heraldry, and their Relics in England," by the Rev. J. W. Wyld, of Southampton. The lecturer stated, that chivalry prevailed in Europe after the demolition of the Roman empire, but was brought into England by its Norman conquerors. Its influence upon society was very beneficial, as it introduced politeness, and undermined the barbarous customs of a dark and cruel age. The Normans, it was observed, did not like submitting their complaints to the decision of a jury, and hence arose what is termed "Wager of Battle," several instances of which were pleasantly adduced. In heraldry, too, Mr. Wyld was equally amusing and instructive.

**Belfast.**—On Monday week a Lecture was delivered to the members of the Working Classes' Association, by the Rev. Mr. O'Hanlon, on "The Institutions and Literature of Greece." The lecture, which was able and eloquent, occupied two hours in the delivery, and was listened to with great attention by a large audience. Donations of 10*l.* from Lord Dufferin, and 1*l.* from W. Mullan, Esq., have been received by the Treasurer.

**Cheltenham.**—Dr. Wright recently delivered a Lecture at the Literary and Philosophical Institution, "On the value of Fossils, as showing the distinct ages of Nature." The lecturer confined his remarks principally to shells and echinæ, and observed, that fossils showed that a large portion of the surface of the earth was made up of the remains of animals and plants. The climate of the earth having varied at different epochs—the Arctic Regions and England having once enjoyed a tropical climate—successive generations were developed, died away, and became extinct. Thus the whole of the population of the stratified rocks, from the chalk downwards, belonged to extinct species.—W. M. Tartt, Esq., the President, then read a paper, entitled, "Anecdotes of Earthquakes," a subject which could not fail to be interesting at the present time. Mr. Tartt remarked, that in the records of the Old Testament there were only three passages in which earthquakes were mentioned. Classical writers of antiquity, in alluding to the subject, did not describe the phenomena by which they were accompanied. It was not difficult to trace the line of great volcanic changes, as, for instance, along the route from Sienna to Rome; and in every country where great organic changes had occurred, there must have been earthquakes equally violent. The earthquakes of antiquity were then described, and a very minute account was given of one which occurred in South America in 1812.

**Darlington.**—A Special Meeting of the members was held on the evening of the 1st inst., in reference to the erection of a building for the purposes of the Institution. Henry Pease, Esq., the President, took the chair. Miss Pease, of Feethams, having presented 400*l.* to the building fund, on condition of the use of the lecture-room being gratuitously given to the Temperance

Society, two days and nights in the week,—the terms upon which such privilege was to be enjoyed were laid before the members, and approved of unanimously. A site has been purchased of the Earl of Beverley, and the Committee will immediately take the necessary steps for commencing the building. It will contain a library, reading-room, class-rooms, large lecture-hall, and ante-rooms, together with accommodation for a person to reside on the premises. The cost is estimated at 1,500*l*.

Glasgow.—The Lecture Session at the Athenæum commenced in October, with an excellent and well-illustrated course on "The Gold Regions of Australia," by John Macadam, Esq., F.R.S.S.A. A second interesting course has just been concluded, by Isaac Taylor, Esq. (author of "Fanaticism," &c.), on which there has been a very large attendance both of members and the public, the receipts from the latter being nearly sufficient to cover the entire expenses of the course. This month George Buckland, Esq., of London, is to deliver a course on "Music;" but what is looked forward to with unusual interest is a Lecture which the Duke of Argyll, the President of the Institution, proposes to deliver on some literary or scientific subject, as soon as his public engagements will permit.

Huddersfield.—The Committee of the Mechanics' Institution, anxious to afford every facility for the improvement of the voluntary teachers of the institute, have commenced a series of fortnightly meetings, for the express purpose of discussing the best modes of teaching the various branches of learning which are at present taught in the Institution. At a recent meeting, Mr. T. V. C. Hardy, Principal of the Huddersfield College, read a paper explanatory of the mode of teaching English.

Leeds.—The annual *conversazione* of the Philosophical and Literary Society was held on the 2nd instant. The President delivered a short introductory paper, giving an account of the relation of the Italian *conversazione* to the English *conversazione*. Dr. Heaton then performed some interesting experiments in illustration of the effects produced by simple chemical agency, in the development of colours. The Rev. W. Sinclair afterwards introduced a paper on Epigrams, in which he showed, that instead of a satirical witticism, or play upon words, as it is generally explained among the moderns, it consisted of some gentle moral and perceptive truth, elegantly and pointedly expressed. Subsequently, Mr. W. Boyne read a short paper on the names of places in and about Leeds, and Mr. C. L. Dresser explained the process of photographing upon glass.

Leith.—On the 30th ult., Mr. Moncrieff, M.P., delivered an Address in the Assembly-rooms, on behalf of the Mechanics' Library, which already contains upwards of 4,500 volumes, and is open to all at a nominal rate. Mr. Moncrieff remarked, that the recent discoveries in astronomy formed an apt type of all human knowledge. There was much which had not yet been discovered, but this should not discourage the student. The habit of observation gave almost a new sense to the observer. It was the same with the powers of reflection. The mechanical arts in their higher branches, especially in the present day, were themselves admirable trainers of intellect, and the mind might still be at work even while the hands were engaged.

Lymington.—On Tuesday evening, the 30th ult., Mr. G. Banks, of this town, delivered a Lecture to the members of the Literary Institution, "On Architecture, in reference principally to that of Egypt." The lecturer dwelt on the grandeur, vastness, and admirable artistic skill displayed in the construction of those now solitary but magnificent temples scattered throughout the valley of the Nile, which, after the lapse of thousands of years, testify, even in their ruins, to the genius of one of the most refined, but at the same time one of the most superstitious, nations of antiquity.

Lynn.—Mr. Henry Edwards, the President of the Conversazione and Society of Arts, recently addressed a very long letter to the Editor of the *Lynn Advertiser*, relative to a proposal for uniting, under one roof, the several literary, scientific, and artistic societies of the town. Mr. Edwards discusses the advantages which would probably result from such a combination, especially when taken in connection with the general Union of Institutions. He estimates the cost of a suitable building and land at £5,000, which he proposes should thus be raised:

| | |
|---|---|
| 1. The Corporation (or an equivalent by way of rent-charge) . . . . | £1,000 |
| 2. Mortgage of the whole property, at 4 per cent. . . . . . . . | 2,000 |
| 3. 200 shares, of £10 each, limited to 4 per cent. . . . . . . . | 2,000 |
| | £5,000 |

The interest on the £4,000 might be provided for by a certain low rent chargeable to each society.

Maidenhead.—The Committee of the Literary, Scientific, and Mechanics' Institute, with their Secretary Mr. C. Brown, have recently been very actively engaged in getting up a local Exhibition, which has been opened to the public, and we are happy to learn, attended with marked success. The Town-hall was appropriated for the purpose, and was fitted up with cases round the walls, a central table, side-tables and other conveniences; the ante-room being filled with choice plants. The collection consisted of a vast array of paintings, specimens of natural history, relics of antiquity, and the products of invention. The exhibition is stated to have been very gratifying, and must have proved highly satisfactory to its promoters. It is worthy of notice, that three days have been devoted to the admission of members of neighbouring Institutions, simply on the production of their card of membership.

Newbury.—Mr. G. Grossmith, of London, delivered a Lecture on the evening of the 30th ult., to the members of the Literary Institution, on "English Notions of American Character." After analysing the works of Parkinson, Janson, Ashe, Birkbeck, Hamilton, Basil Hall, and Mrs. Trollope, the lecturer proceeded to show the spirit and temper in which most of our English travellers had written their impressions of the people. He then contrasted the habits and peculiarities of the Americans with our own, dwelling chiefly on the social characteristics of Yankeedom.

## NOTICES TO CORRESPONDENTS.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings, are requested to forward them not later than Tuesday morning, or they will be too late for insertion in the following Friday's Journal.

*Subscribers to Journal.*—We cannot undertake to forward the Journal to unknown correspondents. In reply to a number of communications, we must state that it can be obtained through the usual trade channels.

*Members.*—Several Members of the Society have complained of not receiving the Journal. In every case, however, it has been found that they were duly delivered, and that the blame really rested with the Members' servants.

*Notice to Institutions.*—We wish to call the attention of the Secretaries of the Institutions in Union, that the schedules relative to lectures are required to be sent in by the 13th instant. It should be noticed, also, that whether lectures are or are not required, the schedules should still be returned.

*Petitions.*—In answer to numerous inquiries as to the best time for presenting petitions to Parliament respecting the distribution of Parliamentary Reports, we have to state that any time during the next ten months will do.

## QUESTIONS FROM CORRESPONDENTS.

*Fishing Nets.*—Can any of your correspondents inform me whether the American loom, for weaving fishing nets, brought to Liverpool in 1850, has been set up, and is at present being worked? I believe it was the intention of the inventor to substitute cotton for the ordinary hempen twine, and I shall be glad to hear if such has been done economically? (No. 5.)

*Gas.*—What is the cause of the superiority (supposing such to be the case) of the Edinburgh gas over the ordinary London gas of commerce? (No. 6.)

*Borax.*—Is there any substitute for borax, which is capable of being applied to the manufacture of pottery and earthenware, with commercial advantage? (No. 7.)

*Coating for Ships.*—What is the best kind of protection for ships' bottoms, so as to prevent the accumulation of barnacles and weeds? (No. 8.)

*Fluoric Acid.*—Can you inform me whether any improvements have yet been made in the materials used for engraving on glass, so as to be less injurious to the health of the workman than fluoric acid? (No. 9.)

*Stained Glass.*—Have any attempts been made to do away with the necessity for joining pieces of differently coloured glass in the production of stained glass windows, either by making the fluid metal take up a coloured impression in the casting, or by one being impressed on it when in a semi-fluid state? (No. 10.)

*Gutta Percha.*—Do you know of any series of philosophical experiments in connection with gutta percha, and its durability when buried in the earth or water? (No. 11.)

*Carpets.*—Has any process yet been patented for enabling pile fabrics to absorb colour from the surface downwards, when in an horizontal position? (No 12.)

## ANSWERS TO CORRESPONDENTS.

*Copper Types* (2).—" Your correspondent (No. 2) asks the reason why copper types, which, according to his opinion, present so many advantages in durability and chances of delivery over the usual types, have not been generally adopted? There are many reasons:—1. Their greater expense. 2. Their not agreeing with the types now in use, which are cast in series; and probably copper is not a material which would work with them. 3. The very important fact that copper, on account of its great value, offers a great inducement to dishonesty, not only from numerous persons having access to printing-offices, but from burglars. A clever thief might abstract hundredweights of type from a large office without its being missed. The present type in a manner protects itself, the metal being useless except for recasting into type, and unsaleable to marine-store dealers. I am inclined to think, too, that as type is frequently exposed to wet, the oxidation of copper would be very injurious to the hands of the compositors; and am doubtful if copper would not be found too sharp for the rollers and the wet paper."—D.F.

"*W. P. B., Wenlock.*"—No arrangements are yet completed respecting the supply of books; the matter, however, is not forgotten.

"*J. A., Gainsboro'.*"—The size fixed on for the Journal is that which was judged most convenient for many reasons; your remarks are very true, but a larger size would also have been objectionable, and for even more weighty reasons.

"*G. R., Redditch.*"—As soon as all the necessary forms required by the authorities at Somerset-house have been gone through, it is hoped that stamped copies of the Journal will be issued.

## MISCELLANEA.

Beacon Buoy.—The refuge Buoy Beacon, for shoals, &c., erected off Calshot Spit, about sixteen months ago, at the cost of Captain Peacock, R.N., having been found to answer its intended purpose, has since been purchased by the Harbour Commission. The Russian Government have lately ordered a similar buoy, which it is understood is to be fixed at Riga.

Society of Arts Exhibitions.—Some misapprehension appears to be current as to the nature of the Society's Exhibitions, and the conditions upon which articles are accepted. The Council desire to make known the fact, that no charge is ever made in respect to space, or for the privilege of exhibiting; all that is required being that exhibitors should deliver at, and remove from, the Society's House all the articles carriage free.

The New Crystal Palace.—A deputation from the Crystal Palace Company, consisting of Mr. Laing, M.P., chairman, Mr. Geach, M.P., Mr. Anderson, Mr. Farquhar, Mr. Fuller, Mr. Leech (solicitor), and Mr. Grove (secretary), had an interview with the Earl of Derby on Thursday, at his official residence in Downing-street. The decision of the Government on the application of the Directors of the Crystal Palace Company for a Charter has now been given. This decision had been postponed until the opinion of the law-officers of the Crown had been ascertained as to the bearing of an old Act of George III.—prohibiting the opening of disorderly places, under the pretence of discussing religious and political questions, on Sundays—on the case of the Crystal Palace. This opinion has been given to the effect that the wording of the statute in question renders it illegal to open any portion of the Crystal Palace or park on Sundays, and, consequently, the Charter has been given with a clause providing that no such opening shall take place unless the Legislature shall think fit to sanction it. It appears from a plan of the building, recently prepared, that the nave and the three transepts are to be laid out as ornamental gardens, relieved by Egyptian obelisks, Greek columns, fountains, &c. The northern side-aisles are to be devoted to architectural courts, to be called the Nineveh, Egyptian, Greek, Roman, Byzantine, Mediæval, Elizabethan, French, Flemish, Italian, and Revised Classical Courts. The southern side-aisles are also to be divided into courts, for the display of mineral manufactures, hardware, furniture, stationery and fancy goods, printed fabrics, flax and hemp, woollen and worsted, and silks, shawls, and lace. In the galleries are to be exhibited: raw produce—articles used as food, musical instruments, precious metals, &c., and they will be so arranged as to afford views into the courts below.

Country Lectures.—A Lecture actually consists of little more than reading a manuscript, and illustrating it in its course; and by the assistance of a reporter, who, in addition to the matter of the text, should describe in marginal notes the experiments performed, with a sketch of the apparatus used, and of the specimens exhibited. I can see very little difficulty of such lecture being repeated in Edinburgh, even by a moderately qualified man. It is merely a matter of pounds, shillings, and pence, which, with an extensive demand, would become a very limited affair. Suppose our Professors were each to reduce their lectures to such a practical form as is referred to above, and have them published, we think there are few towns where some one would not be found, gratuitously, or for a trifling remuneration, competent to rehearse and illustrate such lectures, which, I think, would be eagerly sought after and supported. If a list were subjoined to each course, of all the apparatus, specimens, charts, and materials of illustration required, there would be no difficulty in finding parties willing to supply the whole, of suitable characters, and at fixed prices. A course of one subject might be had at a time.—*Pharmaceutical Journal.*

Direct Positive Photographs upon Glass.—M. Adolph Martin, in a communication to the Paris Academy of Sciences, remarks, that collodion sun pictures, notwithstanding the care of producing them, and the delicacy of their execution, are nevertheless deficient in harmony. With the view of remedying this defect, M. Martin has devised the following plan of operation, which he states to have been most satisfactory. "The collodion which I employ," says he, "is composed of an etherial solution of gun-cotton, obtained by treating 2 grammes of cotton with a mixture of 50 grammes of nitrate of potash, and 100 grammes of sulphuric acid. The cotton, when thus prepared, when well washed and dried, is entirely soluble in a mixture of 10 volumes of ether, and 1 volume of alcohol, which constitutes the solution, to which about 1 gramme of nitrate of silver, transformed to iodide is now added, having been previously dissolved in 20 grammes of alcohol, by means of an alkaline iodide—iodide of ammonium being used by preference. The plate of glass, covered in the usual way with a thin layer of this substance, is plunged before it becomes dry into a bath, composed of one part distilled water, 1-12th of nitrate of silver, and 1-20th of nitric acid. Afterwards it is plunged into another bath of sulphate of protoxide of iron, and finally washed with care. Up to this moment, the image has remained negative, but on plunging it into a bath composed of the double cyanide of silver and potassium, it immediately becomes positive. All that now remains is to wash it, cover it with dextrine, dry, and finally mount it. The cyanuret bath which I employ, is similar to that used by Mr. Elkington. It is composed of 1 litre of water, 25 grammes of cyanuret of potassium, and 4 grammes of nitrate of silver. I have now only to remark that this process has always yielded me proofs, and which proofs are invariably positive. Their perfection entirely depends on the amount of manipulative care brought to bear in their development."

**Mr. Henry Elkington.**—It is with much regret that we hear of the death of Mr. Henry Elkington, so well-known by his Electrotyped art manufactures exhibited at the Great Exhibition. Owing to declining health, he had for some time previous to his death retired from business. We are glad to hear that the firm do not intend to let the artistic efforts made by their late partner die with him—but fully to carry out his views in a commercial spirit.

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☞ *Below is given the first batch of Patents, sealed under the New Law. It is understood that there are somewhere about two hundred stopped, pending the decision of the Board of Trade and the Law Officers of the Crown, with reference to their extension to the Colonies.*

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS AND PROTECTION ALLOWED.

*From Gazette*, 3rd *Dec.*, 1852.

*Dated* 17*th Nov.*

772. J. L. Bell—Treatment of compounds of iron and sulphur.
774. J. Hinchcliff and R. Salt—Steam-engines.
776. F. Bresson—Propelling by land and water.
778. H. V. Physick—Electric telegraph.

*Dated* 19*th Nov.*

779. J. Rock—Buffers.
780. J. Potter—Spinning machinery.
781. J. Hume—Water-closets.
782. J. V. Vernon and J. Edge—Machinery for engraving rollers.
783. G. Hamilton—Spreading starch, gum, &c.
785. P. Carmichael—Machinery for winding yarn.
786. J. Burgess—Dyeing wool.
787. M. Poole—Manufacture of seamless garments.
788. W. Williams—Electric Telegraphs.
789. G. P. Tewksbury—Life-preserving seat.
790. B. Nickels—Adhesive plaster.
791. R. K. Day—Fuel for lighting fires.
792. C. De Bergue—Permanent way.
793. J. R. Johnson—Manufacture of type, &c.
794. M. Poole—Cementing matters for ornament, &c.
795. H. Bessemer—Concentrating cane-juice, &c.
796. H. Bessemer—Crystallization of sugar.
797. H. Bessemer—Treatment of washed sugar.
798. J. J. J. Pierrard—Preparing wool, &c.
799. H. Bessemer—Concentrating saccharine fluids.

*Dated 20th Nov.*

800. R. Taylor—Dye and soap cisterns.
801. J. Trestrail—Raising sunken vessels, &c.
802. J. Brettell Collins—Flooring cramp or lifting jack.
803. J. Nasmyth—Packing cotton, &c.
804. T. Ellis—Metallic band for raising, &c., heavy weights.
805. J. Edwards—Improved envelope.
806. W. Dray—Machinery for crushing, bruising, &c.
807. C. Goty—Pumps.
808. G. Wilson—Glass bottles and jars.
809. W. Green—Textile fabrics and machinery, and printing and embossing.

*Dated 22nd Nov.*

810. E. Bates—Life-boats.
811. B. Walker and W. Bestwick—Braid and machinery.
812. W. Crosskill—Clod-crushers, &c.
813. J. Weems—Motive power.
814. R. Heggie—Railway breaks.
815. J. W. Lea and W. Hunt—Manufacture of iron.
816. W. E. Newton—Manufacture of paper.
817. J. Pepper—Machine for knitting ribbed work.
818. W. Hedges—Carriages.
819. J. Roose—Welded iron tubes.
820. S. Hunter—Anchors.
821. J. Blain—System of corking.

*Dated 23rd Nov.*

822. G. Eade—Breakwater.
824. J. Winter—Combining bars of iron for axles, shafts, columns, &c.
825. J. Winter—Wheels.
826. F. B. Frith—Machinery for dressing velvets, cords, &c.
827. J. Kilner—Insulating telegraph wires.
828. M. L. Parnell—Box staples and striking plates.
829. J. E. Grisdale—Steering ships.
830. J. Armytage and C. Thaxter—Dies for plastic materials.
831. W. E. Newton—Breaks for railway carriages.
832. J. Beale—Steam-engines and packing.
833. J. Frearson—Hooks for garments.
834. C. Watt—Electricity.
835. J. Barker—Separating gold from quartz.

WITH DEPOSIT OF COMPLETE SPECIFICATION.

857. J. Gedge—Looms for weaving.
876. J. H. Salvan—Paletots by felting, &c.
892. D. Woodall—Canal boats.
910. J. Burse and P. Gage—Manufacture of soda-water.
922. E. Brae—Apparatus for stopping and releasing ropes, &c.

*From Gazette, 7th Dec.*

NO APPLICATIONS.

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### WEEKLY LIST OF PATENTS SEALED.

51. Thomas Craddock, Ranelagh-works, Thames-bank.—Certain improvements in the steam-engine and steam-boiler.
70. Robert Lakin, Ardwick, Lancaster, and William Henry Rhodes, of Gorton, Lancaster.—Certain improvements in machines for spinning and doubling cotton, and other fibrous substances.
88. George Holcroft, Manchester.—Certain improvements in steam-engines.
96. Henry Bridson, Bolton-le-Moors, Lancaster.—Certain improvements in machinery to facilitate the rinsing, washing, and cleansing of fabrics, which machinery is also applicable to certain operations in bleaching and dyeing.
117. John Wilson Feil, Glasgow.—Certain improvements in preparing and spinning hemp and other fibrous materials for the purpose of making ropes, twines, and other similar articles.
151. David Wilkinson Sharp, Bingley, Yorkshire.—Certain improvements in machinery for combing and drawing a sliver of wool, flax, silk-waste, and other fibrous substances, and in apparatus for constructing screws to be used in such machinery.
187. Alexander Miller, Glasgow.—Certain improvements in the treatment or finish of textile fabrics and materials,
188. John Weems, Johnstone, N. B.—Certain improvements in obtaining and applying motive-power.
190. James Anderson Young, 185, Buchanan-street, Glasgow.—Certain improvements in dental operations, and in apparatus or instruments to be used therein.
214. Thomas Kennedy, Kilmarnock, N.B.—Certain improvements in obtaining and applying motive-power, applicable to time-keepers and clock-work, and for measuring and registering the flow of water and other fluids, and æriform bodies.
215. John Erskine, Greenock, N.B.—Certain improvements in the manufacture of felted and cemented fabrics.
255. John Crook, and John Wilkinson Wood, of Manchester.—Certain improvements in the method of preserving hoop-iron from oxydation or decay.
279. James Clark, Chapel-house, Paisley, N.B.—Certain improvements in weaving carpets and other fabrics, and in the machinery or apparatus employed therein.
294. Mitchell Thomson, Plymouth.—Certain improvements in lamps and in the production of artificial light.
304. John Patterson, Wood-street.—Certain improvements in buckles or fastenings.
314. Richard Husband, Manchester.—Certain improvements in weaving hat-plush, and other textile fabrics.
325. John Henry Johnson, 47, Lincoln's-inn Fields.—Certain improvements in composing and distributing type.
331. David Laidlaw, Glasgow.—Certain improvements in the manufacture of gas-burners.
364. Matthew Smith, Over Darwen, Lancaster.—Certain improvements in machinery for weaving and printing.
367. Peter Armande Le Comte de Fontainemoreau, 4, South-street, Finsbury.—Certain chemical combinations for the silicatisation of calcareous matters.
369. Thomas Suttie, Greenock, N. B.—Certain improvements in roasting apparatus.
428. John Campbell, Bowfield, Renfrew, N. B.—Certain improvements in the treatment or finishing of textile fabrics and materials.

WEEKLY LIST OF ARTICLES OF UTILITY REGISTERED.—NONE.

# SOCIETY OF ARTS.

**FRIDAY, DECEMBER 17th, 1852.**

## FOURTH ORDINARY MEETING,

*Wednesday, December 15th,* 1852.

The Fourth Ordinary Meeting of the Society was held on Wednesday, the 15th instant, Robert Stephenson, Esq., M.P. F.R.S., Vice-president, in the Chair.

The following were elected Members :

Baxter, Robert Dudley. Highfield, Doncaster.
Francis, E. N., 2, Duke-street, London-bridge.
Garraway, Frederick, Jun., St. John's-wood.
Howard, James H. H., Townsend-house, Dursley.
Roberts, Mrs. Elliot, Twickenham, Surrey.
Starkie, Richard Stringer, 4, Strand.
Wallace, Joseph, Portaferry.
Watson, J. J. W., Gloucester-place, Old Kent-road.
White, Joshua Pugh, Shrewsbury.
Whiting, John, M.D., Lynn.
Whitfield, Henry, Ashford, Kent.
Williams, R., 62, Strand.
Wood, Sir John Page, Bart., Hatherley-house, Gloucestershire.

And the names of nine Candidates for Membership were read.

A Paper was read by Mr. Norton, entitled "Description of an Indicator for Registering Numbers, Distance, and Time." The first application of this invention was for indicating the number of persons passing through any given place where money was received. The Author stated that attempts had been made, but unsuccessfully, to register numbers by means of a step or tread, which alone could not indicate, as it might be acted upon maliciously or accidentally. The improvement consisted in combining the ordinary turnstile, or revolving gate with the tread, in such a manner that the instrument was self-acting, and did not require the person in charge to use his feet on the ingress or egress of each passenger. It was capable of being used in either direction,—and thus might register the numbers passing out of, as well as entering into a building. This was accomplished by means of sliding-rods being brought into contact with the inner surface of a semicircular cone or cap. The distances of the entry and exit-sides of the cone were equal on both sides of the axis through which the rods passed, but varied to such an extent as to drive forward the rod when the stile was turned, and thus set in motion the register or index. It locked itself as each passenger passed through, and would only register one at a time. This turnstile stood within a space of five feet, while those in ordinary use occupied upwards of seven feet. The arms, being jointed, they could be closed up, so as to allow a free passage when required. Mr. Norton here exhibited several models explanatory of the different parts of the machine,—the sliding arm, the tread and bolt, &c.; and pointed out the peculiarities and modifications necessary for its application to omnibuses, steam-boats, theatres, &c. He also showed another form of this contrivance, by which he was enabled to set in motion a power that centralized in one point, and registered at the same time the ingress or egress from any number of stiles, situated at various distances from each other, and in different parts of a building. This arrangement admitted of instant communication being made to each turnstile, so that all the gates might be locked simultaneously at any required moment.

In the Carriage Registering Machine, motion was communicated from the road-wheel to the instrument by an eccentric fixed on the nave. This set in action a ratchet-wheel, which acted upon a series of multiplying wheels connected with a dial situated in the inside of the carriage. On each revolution of the road-wheel a bolt, which was moved backwards and forwards by a spiral spring, acted upon a ratchet-wheel, driving it forward one tooth. Upon the bolt a guard or stop was fixed, to prevent more than one tooth being moved at each revolution; and on it entirely depended the accuracy of the indication. Each time the bolt was driven forward, the guard or stop was carried with it, entering a ratchet with the teeth cut in a reverse direction to those acted upon by the road-wheel. Experience had proved that ratchets, when constructed in the ordinary way, on passing over stones where the vibration was very great, were subject to slip, or be driven forward more than one tooth by a single revolution of the road-wheel. This it was which rendered the stop a necessary safeguard; and without it all instruments were liable to indicate a greater distance than had been actually travelled. The ratchet was the first, or main wheel, in the instrument, and was calculated to make ten revolutions per mile run. This calculation was adjusted to suit all sized road-wheels by simply changing the ratchet. The ratchets were all of one size, and only differed in the number of teeth. The remaining portion of the train was alike for all sized road-wheels.

In another description of the instrument, the principle of the decimal rotation of the ratchet was preserved in connection with a train of wheels and pinions, in continuous action, similar to an ordinary clock train. The ratchet was not driven by the road-wheel, but by a spring, which, when liberated, drove the ratchet. The object of this was to prevent an excessive strain being communicated to the wheels of the instrument. To these various trains of wheels the "fare" indicator was attached; so that when a person engaged a cab, the fare was indicated according to the distance travelled. The fare-dial returned to zero on the egress of the passenger; and neither passenger nor driver had any control over the indicator. When a passenger entered, a depression of the seat or floor took place, bringing into action the productive mileage-train. It ceased to act when empty, and was restored to zero by means of a lever under the control of the driver. The application of these machines to public carriages, Mr. Norton was of opinion would tend greatly to reduce fraud, and effect an important saving on the part of the public. In the metropolis alone there were 3,500 cabs, and, according to a recent calculation, each cab-driver was in the average daily receipt of from fourteen to seventeen shillings. And as it was well known that, instead of the legal fare of eightpence per mile, one shilling was most usually paid by the passenger, to prevent dispute and annoyance, a saving to the public of fifty per cent., or nearly 200,000*l.* per annum, would result from the introduction of a simple and accurate Registering-Machine.

In the discussion which ensued various points of detail were elicited. It was suggested that road-wheels, of diameters less than those for which an instrument was intended, might be substituted by a fraudulent proprietor; and that thus instead of the register being an advantage to the public, it would be made the means of fraud. To this it was replied, that the proper diameter of the wheel for each indicator might be marked on the face of the dial, and then it would be in the power of any person to test for himself the accuracy of the combination. The question was raised, whether in the event of a passenger leaving a vehicle to make a call, the "fare" indicator would return at once to zero. Mr. Norton, in reply, stated, that by means of a lever, the driver had the power of retaining the seat in its depressed position until he had discharged his fare.

The Chairman announced, that on Wednesday evening, the 22nd instant, there would be a Photographic Soirée, when Mr. Roger Fenton would read a short paper "On the present State and recent Progress of the Art of Photography;" also, that the Fourth Annual Exhibition of Inventions, of such articles as have been patented and registered during the past twelve months, was now open, in the Model-room, on the ground-floor.

## EXHIBITION OF INVENTIONS.

The Fourth Annual Exhibition of this series was opened on Wednesday evening. The collection is arranged under six principal heads: 1. Motive Machines, including Railway Mechanism; 2. Manufacturing Machines and Tools; 3. Building Contrivances and Materials, and Naval and Military Mechanism; 4. Philosophical Instruments and Hardware; 5. Agricultural Improvements and Sadlery; 6. Miscellaneous, including Articles for Personal Use.

It would be difficult in a short notice to give anything approaching to a complete account of the entire collection, to which there has been one hundred and twenty contributors. It is therefore proposed to limit the remarks in this week's Journal to the leading mechanical subjects.

M. Fontaine Moreau exhibits a series of Models illustrative of a means of applying electro-magnetism as a prime mover,—the invention of M. Froment, of Paris. One of these machines is for producing rotatory motion, another vibrating motion; and there is likewise a model of an electro-break contact, or inductor. The difficulties which have hitherto prevented the application of this fluid,—the great decrease of power, due to the recession of the machine to be driven from the poles of the magnet, is proposed to be overcome by making each magnet begin to act when its keeper is nearly close to it. The keepers are brought into position by an eccentric. Mr. Weare exhibits a galvanic apparatus worked by a permanent battery, the power of which is regulated by means of a fixed scale, and is said to increase the longer it is in action. Of the models and drawings of railway mechanism, the drawing of the engine designed by Mr. McConnell, for carrying the express trains between London and Birmingham, a distance of 112 miles, in two hours, is that which will most probably attract the greatest attention. The chief peculiarity of this engine consists in the fire-box being extended into the barrel of the boiler, so as to give direct radiant heat, instead of transmitted heat surface through long tubes. Placed beside this is another drawing, showing the most approved forms of four of our leading locomotive builders; thus enabling a good comparison to be made between them. There are gauges and meters of various descriptions, and for different purposes. The balance water-meter, by Mr. Siemens, which was shown in operation, is said to be capable of working under any amount of variable pressure. The Alcohol-meter is due to some recent discoveries in France, which have determined that the boiling point of alcoholic fluids, such as beer, wine, &c., was regulated by the quantity of alcohol they contained, without reference to their specific gravity. The improvement suggested by Mr. Crockford consists in adding a condenser, of any convenient form, so that the alcohol as it rises is condensed, and thrown back into the boiler. By observing the point at which the mercury rises in the thermometer, the quantity of alcohol is ascertained. The glass gauge tube for locomotive engines by Messrs. Thornton and Sons, being made larger at the middle than at the ends, is less liable to break from the pressure of steam within.

Messrs. Johnson exhibit drawings of recent improvements in machines for spinning and weaving. The chief of these are Macindoe's self-acting mule, and Messrs. Dickenson and Williams' power loom. There is also a drawing of an envelope folding, gumming, and embossing-machine. Various mechanical contrivances for simplifying and diminishing the labour required in the preparation of articles of daily use, and for domestic purposes, are contributed by Messrs. Lyon, Kent, Crockford, Moreau, &c. Messrs. Shaw and Buck exhibit models of machines for disintegrating, cleansing, and separating the stones, dirt, and other matter mixed with fruits, as they are delivered to the merchant from the producing districts of Zante and Smyrna. Apparatus connected with mining operations, but especially that contrived for the Gold regions, occupies much space. The gold-washing machines all appear to possess a character in common. A galvanized iron wire, or sieve cylinder, in which the earth is placed, is made to rotate. To its axis dashers, or blades, are attached, which in revolving separate the earth, throwing off the lighter particles from the auriferous matter, and retaining the nuggets of gold and stone. The tools required for dislodging the soil from its native bed are endeavoured to be made as comprehensive and simple as their character will admit, by combining a shovel, pickaxe, crowbar, &c., in one tool. Several modifications of the miner's lamps at present in use are shown. It is hoped that by them increased security may be afforded to the workman when engaged in the pit.

The applications of gas and water to heating purposes assume many novel and interesting features. In the hot water stove of Mr. Phillips, water is made to flow round a heated hollow cone. The gas stove of Mr. Goddard is set in a fireplace lined with glazed tiles, by which a large amount of heat is radiated in an unobjectionable manner; and by the use of asbestos in combination with the gas, an approach is made to the incandescent appearance of an ordinary coal fire. The case of the gas stove, by Mr. Blashfield, is made of a new kind of terracotta. The burner is placed below a hollow cone of fire-brick, which serves to give warmth to the apartment, at the same time that it prevents the emission of noxious vapours. In both cases the desire has been to remove the objections to the use of gas stoves, by substituting earthenware in lieu of metal, which, when highly heated, is very deleterious in its effects.

By thus calling attention to some of the leading wants and desiderata of the day, it is believed important improvements may be realized, and permanent benefit conferred on all classes of society. In our next Number we shall endeavour to explain several articles of manufacture, which possess peculiar interest, both on account of their novelty and utility.

## SUBJECTS FOR PREMIUMS.

In accordance with the grouping of the Standing Committees, of which we published a List in our last Number, the second section of the Premium List is devoted to Machinery. It has been said, in certain quarters, that a Society established for the encouragement of Arts, Manufactures, and Commerce, was stepping out of its appointed path in introducing machinery among its objects. The remark is more specious than forcible. There are unquestionably many very useful corporations dealing with special subjects, with whom it is neither desirable nor advisable to enter into competition. But, on the other hand, mechanical inventions have always, and still continue to occupy a large share of the attention of our members, who are drawn from every class, and are not confined to any particular clique, profession, or business. This composite character of the Society forms one of its highest recommendations. The more minutely the sciences and industrial pursuits are divided, the more dependent are they the one upon the other. The study of any branch to the neglect of all the rest is, therefore, not calculated to promote the advancement even of that branch.

A glance, however, at the subjoined List of Subjects will show, that there has been no wish or intention to interfere with the peculiar province of any other Society. On the contrary, it will be seen that they one and all refer, either to the means by which our Commerce may be extended, or the Arts improved, or to the mechanism directly connected with production and manufactures. The latter point especially requires attention; as on it entirely depends the future welfare of our Colonies, and the prosperity of those vast multitudes who have, during the last few years, left their native country. It is well known that we are indebted for many articles of food and clothing to other climes. Those which come from continental states are in most, if not all, cases ready for immediate use. But those from British Possessions still require a vast amount of labour to be expended on them before they are ready for the market. As an illustration of this, it may be sufficient to mention that the vegetable oils of India imported into this country contain the gummy resinous impurities native to their growth. The processes carried on in the Colonies, and the machinery connected with them, are still rude, primitive, and imperfect. This has, doubtless, been caused, in a great degree, by our mechanists not being sufficiently acquainted with the actual conditions of the case; with but an imperfect knowledge of the materials to be operated upon, and the methods that instinct had taught the natives to adopt. Art invariably follows Nature, copying as best it can the appliances she uses; and the more perfect an art becomes, the more simple and natural will be its *modus operandi*. This degree of excellence cannot as yet be expected in the Colonies. For some years to come, machinery will have to be exported from this country. It is therefore essential that it should be so contrived, that the fewest number of parts shall be required to be sent from England, and these as light and as little likely to be broken as possible;

or if broken, capable of being easily repaired by rough workmen. It is well worthy of consideration, whether the abundant resources of Nature in those parts might not be turned to more profitable account. By the introduction of improved processes, it may reasonably be expected that not only would chemical and other substances be extracted from the now refuse materials,—Indigo, for instance, from Flax, at present only grown in India for the linseed,—but the products generally would be so purified, that instead of mere staple, the Colonies might export articles fit for instant application to manufacturing purposes, if not for immediate use. The complete consummation of this idea may be delayed; but the time will come, is perhaps not very far distant, when by the discovery of a new motive power, in which coal and iron shall constitute less important elements, nations not possessed of those valuable minerals may be able to compete with more favoured lands.

It will be observed that the Section concludes with several questions relative to the most recent art,—that of Photography; an art which has sprung into such rapid existence and utility, and is still in so progressive a state, that there is fear lest the links by which these results have been attained should be lost to the world. Though to be an expert in this art requires a certain amount of scientific attainments, it is believed that, like most other arts, its progress is rather due to the practical manipulator than to the experimental theorist. There is ample field also for the philosophical instrument-maker, who is called upon to exercise his ingenuity to aid this art, by designing instruments of greater power and intensity, and capable of assisting in the retension of the colour, as well as the outline and form, of the object represented. At the same time they should be of a lighter, more portable, and economical character. The intended Photographic Exhibition of this Society will, it is believed, demonstrate very fully the present condition of the art, the perfection which it has already attained, and the means by which that perfection has been arrived at.

## CLASSES V. TO X.—MACHINERY.

41. For an account of the most recent improvements in Marine Engines, having for their object the reduction of the weight, and the increase of speed.

It is well-known, that a comparison of the ratios subsisting between the horse-power and the weight of machinery in the marine engine, and in the locomotive, is greatly to the disadvantage of the former. And though, from the peculiarities of the case, it may not be possible to arrive at the same degree of excellence, it is felt, by practical engineers, that a closer approximation to it ought to be attained.

42. For the best means of increasing the draught through the Furnaces of Marine Boilers.

The slow combustion in the furnaces has been assigned as one reason why the marine engine would not bear a favourable comparison with the locomotive. An efficient means for promoting this end could not fail to produce a good result.

43. For the adaptation of a new submerged Propelling Power in Marine Navigation, which shall possess all the advantages of the Screw-propeller, and be more immediately acted upon by the moving power.

The opinion now seems to be becoming pretty genera that, sooner or later, the paddle-wheel must gi place to the screw, or some other form of submerge propeller. This is particularly the case with wa steamers. The objection to the screw is its distan from the engine. There is, even with the be machinery, much loss of power in transmissio through a long shaft.

44. For improvements in Railway Buffers, Dra Links, and means of Coupling, especially applicable merchandise and other wagons.

Scarcely any of the wagon-stock on railways ha at present, these necessary appendages. It no appears to be considered that all the carrying stoc for whatever purpose designed, should be so su plied, both on the score of economy and safety. T show how this may be accomplished at little co would therefore greatly tend to its realization.

45. For an account of the mechanical means present in use to facilitate the operation of Packi Goods, &c., whether by Hydraulic Presses, or othe wise.

Many materials, cotton and wool, for instance, havi to be transported to a distance to be manufacture it becomes an important element to compress the into the smallest compass, with the least possib expenditure of power, and with the lightest an most portable machine.

46. For a resumé of recent improvements tending shorten the processes, and facilitate the production different manufactures:—1st. In reference to Texti Fabrics. 2nd. In reference to Fictile Materials. 3r New Mechanical Appliances.

A review of what has been already done in any pa ticular branch of industry, as well as in any scienc is one of the best and surest means of drawing th attention of inventive minds to the subject, an leading the way to new achievements. In by f the greater number of cases, inventions are but th further development of old ideas and principle and anything which serves to keep these before is certain to be productive of good.

47. For an account of recent American Invention having for their object the substitution of mechanic processes for manual labour in the household and d mestic arts.

Many of the useful, though apparently unimporta contrivances, in common use in the States, f facilitating, or altogether dispensing with manu labour and attention, might, it is believed, b imported hither with advantage. Even if n applicable to home purposes, they would certainl be of considerable service to emigrants.

48. For the most economic method of Ginning Cotto so as to obtain the longest and cleanest fibre.

The objections to the use of the saw and roller-gi are, that, in the one case, the fibre is cut by t action of the saw, reducing it to short lengths, an that in the other a portion of the seed is crushe by which the colour of the fibre is injured.

49. For improvements in Machinery for Printi Calico and other fabrics, by which ten, or more differe colours may be worked simultaneously, and with a curate register.

Of late years, cylinder-machines for printing che cotton and other fabrics have attracted much atte tion, to the neglect of the ordinary block-machine which are known to produce a superior article, point of softness and artistic effect.

50. For an account of recent improvements Machinery for breaking, cutting, and dressing Flax.

The cultivation of flax is daily becoming a mor important branch of industry; and as the discussio of the subject has shown that but little has been done for many years to improve the mechanism employed in its preparation for the market, a good essay would be of great value.

51. For an account of improvements in Machinery, and processes for converting spun and other yarn into Rope, Twine, &c.

Though Huddart's machines for the manufacture of rope have been in operation for a considerable period, simplicity of construction is still a desideratum. It is singular that, in many instances, hand-labour is still employed in this purely mechanical manufacture.

52. For an account of the methods now in use for working Malleable Iron; and of any recent improvements in the machinery employed for converting Iron into Bars, Plates, &c.

The vast extension of the iron-trade of late years has led to many important alterations. The large and heavy pieces of machinery now made have not only affected the mechanism connected with their production, but also the manipulation of the material itself. The recent introduction of heavy rails, to supersede the use of stone blocks and sleepers, in the construction of the permanent way of railways, has likewise caused some change to be made in the rolling-mills employed in their manufacture.

53. For the construction of Moulds without seams, or joints for Metal-casting, in the round, or in relief.

The use of elastic moulds in the production of metal-work, by means of electricity, naturally leads to the suggestion, whether any treatment of the same material might enable moulds of this description to be employed in the casting of metals.

54. For the production of Castings in Iron, equal in sharpness and in delicacy of surface to those now imported from Berlin.

It is said, that the great cause of the superiority of Prussian and Swiss fine-art castings is attributable to some peculiarities in the sand used in forming the moulds.

55. For a cheaper mode than any at present practised of working Mouldings and other Architectural features in Granite, or other stones.

The present methods are very destructive to the machinery. With free-working sandstones, the difficulties to be overcome are not so great as with grit-stones; the results obtained are, therefore, more favourable in the former case than in the latter. The powdered stone clogs and destroys the bearings, and eventually stops the machine.

56. For the best, simplest, and most economic Flour-mill, for the use of Emigrants and Settlers.

The extension of civilisation, the subsequent centralization of all manufactures, and the division of labour which this has led to, have induced the construction of powerful machinery applicable to the preparation, on a large scale, of the food of man. But the simple and primitive methods used by our forefathers have been altogether overlooked. The production, therefore, of a simple, portable, efficient, and inexpensive mill, which shall be capable of grinding and dressing the emigrant's meal, placed as he is in a somewhat similar position, is a point worthy the attention of our ablest mechanists.

57. For the best account of the methods at present employed in France and England for Grinding, Dressing, and otherwise preparing Flour.

The superiority of French bread is now universally admitted, and even in this country we find the finest qualities called by that name. There can be no doubt that this is partly due to the method of dressing the flour, and partly to the grain being in a drier state when placed in the mill.

58. For improvements in the Machinery and processes connected with the production of Coffee—for treating the pulpy fruit, and for curing the beans.

Hot air has of late been successfully employed in the preparation of many articles of food; amongst others, to the roasting of coffee. It is now a question, whether some mechanical contrivance for taking advantage of the direct rays of the sun, more effectually than is done at present, may not be introduced. The pulping process is attended with much inconvenience, and it is extremely desirable that some improvement should be made in that direction.

59. For an account of recent improvements in the Machinery and processes employed in the manufacture and preparation of Sugar from the Sugar-cane, and its comparison with Beet-root Sugar.

The enormous loss which has hitherto been sustained, in consequence of imperfections in the processes and mechanism connected therewith, calls for a speedy remedy. In some respects, beet sugar is said to be superior to that made from the cane and the maple; the crystals being larger and firmer, its cohesive force is consequently greater.

60. For the best account of recent improvements in the Construction and laying-out of large Breweries, and the "Plant" connected therewith.

The large breweries of the metropolis and elsewhere, having grown up by slow degrees, have been added to "piecemeal," so that there is a want of consistency and uniformity which would not be admissible in a modern establishment. The "plant" is generally cumbersome and inconvenient, and stands in much need of modification.

61. For a simple and inexpensive Apparatus for Brewing Beer, suitable for the use of cottagers or emigrants.

Brewing has always been looked upon as one of the Domestic Arts; but it, like many others, has been influenced by the centralization system. The object required is to extract the saccharine matter, and convert it into an article fit for the table, by one simple process.

62. For the best Essay on the means by which the Roofs and Walls of large Buildings may be constructed so as to avoid interference, by Echoes, or Sounds, with the utterance of a voice, and to render such audible to the largest number of persons; with especial reference to the building of Lecture and Meeting-rooms.

The principles of Acoustics, at all events in their practical applications, do not appear to be well understood. Too little attention has hitherto been paid to this subject by architects and builders, and the consequence is a most lamentable deficiency, in this respect, in many modern edifices.

63. For the best Essay on the Construction of Fire-proof Buildings.

Though it is a disputed point whether our ordinary dwelling-houses can be made absolutely fire-proof, there can be no question that the nearer we approach perfect immunity from danger from fire the better. There seems to be no reason, however, why all buildings, other than dwellings, should not be rendered perfectly secure, as in some few instances they are at present.

64. For the best Essay on the Construction of common Roads.

This branch of Engineering has, of late years, been comparatively neglected for the more attractive railways. Roads can scarcely be said to have been improved since the time of Telford. The Holyhead road is still a masterpiece. Now that the condition of our towns is being looked into, we may expect some reformation, particularly in the matter of paving.

65. For an account, accompanied by a series of drawings, of the Construction of Saloon-steamers on American Rivers; and the adaptation of the principle to European River and Ocean Navigation.

These "floating hotels," as they are termed, are a subject of universal comment by travellers. They appear to present many points worthy of imitation, and, with our variable climate, to be well suited to meet the exigencies of an increasing river-traffic. The cheapness of glass affords an opportunity for constructing the sides almost entirely of that material. Whether the principle can be successfully carried out for ocean navigation remains, however, to be proved.

66. For the most economic means of obtaining and maintaining a Vacuum; and the purposes to which it may be applied.

Though in its strict and absolute sense the attainment of a perfect vacuum is impossible, yet it is well known that we have practically realised this desideratum to a very great extent. There is scarcely a single piece of machinery which does not owe its efficiency, in some degree, to this property. The steam-engine itself may be cited as, perhaps, the most important. More recently, the principle has been applied to many manufacturing processes—the manufacture of sugar, for instance; and, as it would appear, with considerable advantage.

67. For an Essay on the Scientific Principles evolved in the application of the Stereoscope.

As no complete and popular treatise has yet been published on this subject, which is one of growing and daily-increasing interest, a good essay would be very valuable.

68. For improvements in the Oxy-hydrogen Microscope, and the method of illuminating it, by which a bright object may be presented on a dark ground.

The objection to the oxy-hydrogen microscope is, that it presents a dark object on a bright ground, causing great injury to the sight of persons using it. An efficient means of inverting the order, and producing a bright object on a dark ground, is, therefore, a desideratum.

69. For a cheap, convenient, and portable Camera, with stand and materials complete, for taking Calotype views.

A light, portable tent, to serve as a dark chamber, is much required as an appendage to the ordinary camera. Improvements in the camera should tend to compactness, simplicity of construction, and perfection in use.

70. For the most sensitive portable means of taking negatives for Calotypes.

The preparation of the collodion plates should be such as to enable them to retain their sensitive properties for a longer period than at present, so as to render the bath unnecessary in out-door operations.

71. For the best means of bringing an object within range of a Camera, when beyond its focus.

It is thought that this might be accomplished by placing a more or less transparent medium between the lens and the box of the camera, or by the introduction of an additional glass.

72. For an Essay on recent discoveries in the production of Photographic and Talbotype Images, especially in the taking of material objects by means of the Microscope; with Illustrations.

The camera, in combination with the microscope, has now been brought to bear directly upon this most interesting art.

73. For a good and cheap method of making Glass Balance-springs, suitable for Marine Chronometers.

Glass springs have many advantages over those made of metal. They require little or no compensation, and are not liable to rust, a point of great importance at sea.

## AGRICULTURAL IMPLEMENTS AT THE SMITHFIELD CLUB CATTLE-SHOW.

THOUGH this department forms but an adjunct to the great annual metropolitan gathering, and though at the numerous meetings of a like character held throughout the year in different counties, implements are exhibited, there is still occasionally to be found at the Bazaar in Baker-street some new principle, or novel application of one previously known. It must be confessed, however, that by far the greater number of articles are tried and old friends, proud of displaying all the honours and rewards received from various Agricultural Societies and Associations.

The most important collection, both in value and in extent, in the present Exhibition, is unquestionably that contributed by the Messrs. Garrett. Taking advantage of the inventions of our Brothers across the water, they have registered some improvements in Hussey's American Reaping-machine, which bid fair to make that hitherto useful machine still more complete. In the machines brought over from America, the cutters were bevelled on both sides, similar to a common axe, which was found, in cutting soft straw crops, such as barley and oats, to have the effect of bending the straw between the iron guards in which the cutters work, and pulling it instead of cutting it. The improved form of cutter is bevelled on one side only, similar to a pair of shears, or scissors; and, cutting against a keen square-edge guard, made of steel, this defect has been completely remedied, and crops of any kind may now be perfectly cut with equal precision and facility. Two horses, one man, and a lad, will cut about an acre per hour. Messrs. Garrett also exhibit a broadcast manure-distributor, the invention of W. Blyth, Esq., of Burnham, the novelty of which consists in the arrangements for effecting the delivery of difficult manures used as top-dressing, such as nitrate of soda, guano, &c. A shaft, fitted with prongs, revolves in the barrel containing the manure, and in doing so comes in contact with a series of scrapers which rise with and clean the barrel as it rotates, without the aid of brushes or any other perishable material. The manure then passes down a shoot, or conductor, in which alternate lines of wire rods are fixed, serving still further to separate and pulverise the material.

A very useful and compact hand-mill, for grinding flour and dressing it at the same time, is exhibited by Messrs. Lloyd and Sons. The meal, after being ground, passes into a cylinder fixed at a certain inclination. The under-part of the cylinder is perforated, to admit of the passage of the meal into the different drawers placed beneath it. In the cylinder there are revolving brushes, which keep the meal in motion, and by these means the heavier particles descend gradually to the lower end, the lighter—that is, the fine flour—falling at once into the drawer. This machine is capable of sorting the meal to an inconceivable extent—fine flour, firsts and seconds, pollard, and bran, all being completely separated into distinct drawers.

The great advantage of glass vessels over those made of earthenware, for dairy use, is now universally admitted. In this department, Messrs. Cogan show several very ingenious applications. Among these, a churn, the barrel of which is made of strong glass, and a glass pail, may be especially noticed. In both cases, the total absence of metal will be recognised as an important feature. It should be stated that the glass pails have portable bottoms and handles; the former of basket-work, the latter of gutta percha.

In the double-acting churn and sausage-meat chopping-machine, exhibited by Messrs. Dray, vertical and rotatory motion are ingeniously combined. But what will be looked upon with the greatest interest in their collection is a grindstone, in which, instead of the usual bearings, each end of the axis is supported by two small anti-friction rollers, so that the force required to set the stone in motion is exceedingly small: and, when once in motion, very little power is sufficient to sustain it.

In conclusion, it is to be regretted that no systematic classification of the articles exhibited is adopted; and this is rendered all the more perplexing by the want of a Catalogue. The opportunities which agricultural implement-makers have had, more than any other class, to compare together the results of their individual experience, and of which they have not failed to avail themselves, have certainly done much for this kind of machinery. It is believed, however, that a great deal yet remains to be accomplished. Many of the machines appear unnecessarily complex in their arrangements, have a far greater number of parts than is necessary, and these again are of heavier calibre than the actual conditions seem to require.

## COLONIAL CORRESPONDENCE.

### THE WEST INDIAN LABOUR-MARKET.

The following valuable remarks on the state of labour in the West Indies, and the emigration of Chinese labourers to those colonies, are extracted from a communication lately made to the Colonial Committee by Mr. W. P. Hammond, of the firm of Parker Hammond, and Co.

"It has been truly remarked by Sir Archibald Alison, in his recent continuation of the "History of Great Britain," that the present period will take its place in the records of the world as 'the age of migration.' The sources of this migration are as remarkable, and as eminently adapted to carry out the designs of Providence as the causes of the movement. Whilst the latter may perhaps be mainly attributed to the discovery of gold, and to over population, the former may be considered to centre in Great Britain and in China.

"These two nations, so distant and so different from each other, appear destined specially to be the instruments in carrying out to completion the command—'Increase and multiply, and replenish the earth and subdue it;' and in considering the singularly opposite characteristics of the two races, I think it will be found that this very diversity will prove no unessential element in carrying out this great result. The former country,—the very type of progress and energy, — the workshop of the world, — the steward of so many possessions, and as she is insular in position, so also is she almost equally isolated in 'daring to be free,'—such a people are essentially adapted both by education and intellectual development, to take the lead in new commonwealths, and to give the initiative to unborn empires. The latter country,—the very impersonation of finality,—the voluntary captives of an exclusive despotism, the jealous possessors of a mighty country, rejoicing in the epithet of the "Great Unknown," wrapt in the complacent self-conceit of its by no means contemptible, but wholly unprogressive civilization, though the veil which thus enshrouds one-third of the human race is, I trust, rapidly rising. Such a people have received, in the school of ages, the lessons which especially suit them to the plodding and relatively unintellectual position of the subordinate and the labourer.

The Chancellor of the Exchequer, in his elaborate statement of Friday last, touched upon two points having reference to this remarkable people,—the reduction of the tea duties, and the value of China as a labour-market. The former cannot fail to stimulate a wholesome and mutually profitable intercourse between the two countries, as yet so little known to each other, and will also, I trust, be the commencement of a policy, having for its object the removal of the distrust and jealous isolation which has hitherto animated the government of China in its relations with this country. With the latter (that is Chinese labour), as more applying to the subject before me, I have more to do.

"It is not the least remarkable social phenomenon of our times, that whilst the West Indian Colonies urge with great justice, the injury which their interests suffer from want of labour, one of the largest and most agricultural provinces of China should possess thousands,—I might almost say millions,—of able-bodied and industrious labourers in a state of semi-starvation from the want of remunerative employment. Now in reference to the West Indies, Mr. Disraeli says, 'Certainly nothing could be more legitimate than the immigration of labourers into our colonies, and it is one which undoubtedly ought to be encouraged. My attention, as was the attention of the late Government, has been drawn to the subject of the immigration of Chinese labourers, and it certainly is a most important subject for consideration.'

"The Chancellor further stated, that this emigration was opposed to the laws of China; but he added, in effect, that this difficulty appeared to have been readily got over, which was naturally to be expected, when the same description of emigration has taken place to the Eastern Archipelago and to Singapore, as well as to other places, for many years without any apparent objection on the part of the Chinese Government. He further mentioned, that several vessels had already been despatched 'under Government control,' to the West Indies with emigrants.

"The three primary demands of the West India planter appear to have been,—the retention of protection in his staple product, sugar,—an augmentation of the sums at the disposal of the Colonies for the purposes of emigration,—and an increased supply of labour. As the Government state decidedly, that, in their opinion, the planter is already able to command the home-market, without that protection which perhaps it had been better for him that he had never received, and that the artificial aid of loans did not appear to be practically useful, even to the extent of the present grants, it especially behoves the West India interest to look to the third point, viz., a supply of labour.

"The port of Singapore, established as you will be aware in the early part of the present century, by Sir Stamford Raffles, upon the principles of perfect freedom of trade, and with the most perfect success, has obtained its supply of Chinese labourers for many years *exclusively* by the agency of private enterprise, the penniless

Chinese being brought down in Chinese vessels, and the price of the passage being paid by their employer on arrival, in exchange for an agreement to receive only partial remuneration, for a certain period, such period being regulated solely by the natural influence of supply and demand. This plan has been, therefore, in active operation, in a British island, for a series of years, without the slightest approach to, or fear of slavery, or anything analogous to it.

"Now the Chancellor in his statement as regards the West Indies, proves two things,—that the consumption of Colonial sugar has greatly increased under freedom of trade, whilst the artificial effort to stimulate emigration by Government loans or bounties, has at all events only partially succeeded. Let us hope, therefore, that as the West Indies are in future to rely solely on their own energy and resources, that the Government will at least accede to their request to be allowed to manage for themselves also in the matter of emigration.

"But at present, the law in many of the West India Islands enacts, that any contract made with labourers for a longer period than one year is illegal. This policy is best symbolized by the Cup of Tantalus,—the planter is allowed to introduce the labourer, but just at the period when his labour is likely to become valuable, and the necessary initiation into the details of his duties is completed, his employer is made to forfeit, 'by Act of Parliament,' all chance of obtaining a return in usefulness for his outlay in conveyance, and trouble in instruction, by the compulsory termination of his agreement. I am assured by parties thoroughly conversant with the position of the West Indies, that were permission granted for the introduction of Chinese emigrants, under contract for three or five years, that they see no difficulty in arrangements being made with planters for their introduction.

"Under these circumstances, it would surely be better that Government should leave it to the planter to supply himself with labour by means of private enterprise, rather than through Government agency, which is always expensive, and frequently unsatisfactory, and has the additional objection that it acts as a serious check to any private arrangements, by raising a Government competition against individual exertion. I am strongly of opinion, that the legitimate interposition of Government should be confined to ensuring at the port of shipment, such conditions as the following:—A proper vessel with suitable and convenient accommodation, due regard being had to the habits of the emigrants; a medical certificate of health and good constitution of each emigrant on going on board; a competent surgeon, and good and abundant food. On arrival in the West Indies, the labourer should have a prompt and gratuitous means of obtaining redress, if not in every way properly treated by his employer.

"I am informed, however, that amongst other conditions required by the local authorities, it is necessary that each employer should have substantial cottages ready built before he is permitted to land the emigrants. This, under all the circumstances of the case, raises a most serious impediment, and, coupled with the restriction to a twelve months' contract, constitute by far the most important, if not the only, hindrance as to the satisfactory and voluntary introduction, on the part of private owners of estates in the West Indies, of one of the most docile, thrifty, and strong-constitutioned race of labourers on the face of the globe,—denizens also of a latitude the same as that of Cuba.

"Feeling that this is a question especially interesting at the present moment to our West India Colonies, and being one with which I have for some time past made it my business to become acquainted, as a practical and commercial operation, I have taken the liberty of troubling you with this unintentionally long communication, knowing that our Colonial Committee are desirous of availing themselves of any information or remarks likely to advance the interests of those important dependencies."

## HOME CORRESPONDENCE.

### LECTURES.

SIR,—I read with much pleasure an article in your last Number, under the head of Lectures, and signed "Y. Z.," in which the writer proposes to raise the character, and increase the utility of Mechanics', and similar Institutions, by giving them more the form of People's Colleges. I have long felt convinced that the present system adopted by Mechanics' Institutions in general, is not one which is likely to raise a class of philosophers, whose services will be of much benefit to themselves, or to Society at large.

The argument that has hitherto been commonly used in favour of such Institutions, is that of their keeping people from the public-houses, and hence a large proportion of them are little more than simply places of amusement. Could not, therefore, some plan be adopted by which, in addition to their present advantages, Mechanics' Institutions might be able to offer a more complete system of instruction than they at present do, by Courses of Lectures, Laboratory instruction, Schools of Design, &c.; and that examiners should be appointed, to hold examinations and confer certificates of different orders of merit? It may be said, in answer to this, that such additions would require an outlay which but few Institutions could afford. It is true that additional expenses would certainly be incurred, but I believe by combination these would be greatly reduced; and that when once the country saw and felt the great advantages likely to accrue from such a system, Government would be more willing to make grants and furnish loans for carrying out so important an object.

When we consider how many of the most intelligent of our countrymen of the present day have risen from very inferior stations in life to the important and useful position they now hold in society, it becomes of the utmost importance for the prosperity of a great commercial country like this, that every opportunity should be afforded to those whose mental capacities are only waiting a stimulus, or waiting an opportunity, to bring them into activity.

A. B., Treasurer of an Institution.

### PHOTOGRAPHY.

SIR,—I am glad to see the Society, by its Prize List, calling attention to the manufacture of Cameras and other matters connected with Photography. No mention, however, is made of a desideratum; namely, good porcelain dishes, or a cheap substitute for them, which will stand the action of the gallo-nitrate mixtures. The glazing of almost all is very defective in having flaws, or cracks, into which these mixtures penetrate, defying all cleaning, even with nitric acid. The consequence is that each of these flaws becomes a centre of decomposition, spreading over the whole quantity of the mixture, producing a marbling of the proof, and destroying the negative. As however the Society does not confine its Prizes to the objects named in its List, I wish that manufacturers would turn their attention to this want, and send specimens to the Society for its judgment.

By-the-by, I hope the cameras sent will be good *working* instruments, not enhanced in price by too much French polish and ornament, with which makers are too apt to favour us poor photographers. F.

## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Institute of Actuaries.—The first ordinary Meeting of the Session, 1852, 53, was held on Monday, the 29th of November, John Finlaison, Esq., President, in the chair. The President opened the meeting with a review of the progress of the Institute, now entering on its fifth Session. The Secretary announced numerous valuable donations to the library, including several from foreign corresponding members. Lord Overstone was elected an honorary member of the Institute.

Three papers occupied the attention of the meeting. The first was "On Formulæ for obtaining the Value of Policies at an Intermediate Period of the Year," by James Meikle, Esq. The author considered that the method frequently adopted in the valuation of policies at an investigation involved an incorrect assumption, which deviated further from the truth the longer the policy was in existence. The value of a policy at the beginning or the end of the year is found by a direct calculation; but in order to bring out the value at an intermediate period of the year, it was the practice to add to the value of the policy, calculated at the date of next premium becoming due, a proportion of the annual premium corresponding to the unexpired portion of the year. The author considered this addition to be excessive, and deduced formulæ to suit the various systems adopted by actuaries, from which Tables could be compiled for an average intermediate month by a direct calculation, without the necessity of first finding the values at the beginning and end of the year, and interpolating for the particular month.

The second paper was "On the Life-Assurance Companies of Germany, their Constitution, Condition, and Prospects," by Herr Rath G. Hopf, of Gotha. The author compared the systems of the French and German Companies, and showed that the latter have been constituted more on English models than the former. An effort was made to establish a Life-assurance Company in Germany as early as 1806; but the unsettled state of the country rendered this and other attempts abortive, nor was it till 1829 that the first Company was formed. This was established in Gotha, and now comprises upwards of 16,855 members, upon whose lives 3,800,000*l.* sterling is assured. In twelve Companies (all established since 1829), the total amount of sums assured on lives is stated to be upwards of 7,400,000*l.*; and the number of policies 1,836,455. The paper concluded with a short account of the system of each Company.

The third paper was "On the Insurance-Companies of Austria," by Herr S. A. Daninos, of Trieste. The author gave an account, on a somewhat similar plan, of the Assurance Companies in the Austrian empire; but included also those for fire, marine, and other branches of assurance. It appears that, in the proprietary and Mutual Fire-Insurance Companies, 172,000,000*l.* sterling was insured in 1850; and that in Trieste, and other places on the Adriatic, there were no less than thirty Companies for maritime assurance, of which twenty-six possessed a joint capital of half a million sterling.

It is little known in England to what extent the principle of the assurance of life and property has been carried on the Continent; and it is gratifying to think that these communications on the subject should have been one of the results of the Great Exhibition. The Institute of Actuaries took advantage of that occasion to form a gathering in London of the representatives of the different systems of assurance in all parts of Europe and America, and subsequently elected the leading actuaries of each continent corresponding members of the Institute.

## PROCEEDINGS OF INSTITUTIONS.

Ashbourn.—On the 6th inst., Mr. J. Bamford delivered a Lecture to the members of the Literary Institute, entitled, "An Hour with Goldsmith." The Lecturer opened his address by some general remarks on the varieties of poetry, and the elements which are essential to give it a continuing popularity; and then went on to discuss the peculiarities of Goldsmith, which had given to his writings the undying popularity they possessed.

Carlisle.—On Tuesday, the 7th inst., the Rev. Richard Hunter delivered a Lecture to the members of the Mechanics' Institute, on "Speech, as indicative of Man's Pre-eminence over the Brute Tribes." Mr. Hunter opened his discourse by a few general and appropriate remarks to show that the faculty of speech, which he defined to be the articulate and audible expression of ideas and emotions, was that which distinguished man from the inferior animals. He then traced the distinction between reason and instinct, and contended that the sounds made by any given class of inferior animals had been from generation to generation the same, and were similar in every clime; whereas with man the fact was widely different.

Darlington.—On Tuesday evening, a Lecture (the first of a series of three) was delivered at the Mechanics' Institution, by E. Ward Jackson, Esq., of Norton, "On the Moral, Social, and Physical Condition of the People of this country during the past Fifty years." The lecture contained a vast amount of statistical information of much importance, gathered from Parliamentary papers of undoubted authority, tending to show that great efforts have been made to improve the condition and increase the comforts of all classes, but especially of the industrial part of the population.

**Gateshead.**—The first *Soirée* of the members of the Reading-room was held on the 30th ult., at the Public-rooms, when about 400 assembled. Mr. A. G. Gray took the chair. The meeting was addressed by Mr. Joseph Cowen, jun., of Blaydonburn, and Mr. T. P. Barkas, of Newcastle.

**Huddersfield.**—The Second Fortnightly Meeting at the Mechanics' Institution was held on Saturday evening, when Mr. James Hanson delivered a Lecture explanatory of the Pestalozzian system of teaching, with illustrations. Dr. Cameron, Mr. Brice, of the Huddersfield College, Mr. Senior, Mr. Hanson, and others, took part in a discussion on the subject after the lecture.

**London.**—On Monday evening a *Soirée* and *Conversazione*, in celebration of the Twenty-ninth Anniversary of the Mechanics' Institution, was held in the theatre of the Institution, Chancery-lane. Lord Dudley Stuart, M.P., Mr. Oliveira, M.P., and other influential gentlemen, were present. Lord Dudley Stuart, in addressing the meeting, spoke briefly, but forcibly, in favour of Mechanics' Institutions, and the benefits which had already accrued from their establishment. The plan was yet in its infancy; but he did not doubt that when the sphere of their operations became more extended, and better appreciated, still more gratifying results might be looked for. His Lordship, after passing a high eulogium upon the character of the late Dr. Birkbeck (the original Founder of these Institutions), regretted that the Government had not thought proper to award more than a pension of 50*l.* per annum to Dr. Birkbeck's widow,—though it was partly accounted for by the Secretary of State being limited to an annual expenditure of 1,200*l.* in pensions upon the Civil List. Such a scanty sum as 1,200*l.* per annum was totally insufficient to meet the many just claims upon it which were brought to the notice of the Government in the course of the year; and though he (Lord Dudley Stuart) had always been averse to any lavish expenditure of the national income, he would gladly give his support to any measure which might be brought forward to increase the sum so placed at the Secretary of State's disposal. After the address, the meeting was entertained by musical and dramatic performances, by the members of the musical and elocution classes connected with the Institution.

**Lymington.** — On Tuesday evening, Mr. D. Macintosh delivered a second Lecture on "Geology," at the Literary Institution. He spoke of the periods when the earth was inhabited by races of animals which have long passed away—the formidable Ichthyosaurus, the tremendous Dinotherium, the primeval Elephant, the colossal and sullen Megatherium, the singular-looking Plesiosaurus, an inhabitant of this part of the island, and the winged and bat-like Pterodactyle, or Flying Lizard, &c.; all which had evidently been adapted for the full enjoyment of animal life. The lecturer alluded to the stratified rocks, as including a multitude of distinct deposits, most of which inclosed organic remains, derived from successive races of animals and vegetables, comparatively few of which, except in the upper formations, seem to have any living congeners.

**Modbury.**—On Friday, the 10th inst., a Lecture was delivered at the Institution by the Rev. John Pyer, of Devonport, on "Modern Popular Literature." The lecturer took a brief but comprehensive glance of the rise and progress of literature previous to the printing of the first book in the English language, by William Caxton, down to our own times; dwelling more particularly on the popular literature of the present age. The lecturer concluded by giving the youthful members some useful hints on profitable reading.

**Newport, Isle of Wight.**—On Thursday evening, the Rev. E. Kell delivered a very excellent Lecture, on "The Roman Antiquities to be found in the Isle of Wight," to the members of the Athenæum. The lecture was illustrated by a vast and rare collection of Roman coins, in copper, silver, and gold, found in the island, as well as urns, bracelets, weapons of war, &c.; most of which are to be placed in the Isle of Wight Museum.

**Pudsey.**—A Special General Meeting of the members of the Mechanics' Institute was held on Wednesday evening, for the purpose of amending the rules and regulations. This Institute now numbers upwards of 150 members, of whom 80 are females. All the classes are in full operation. Four nights in the week are devoted to the use of the male members, and two nights for the female members. In the classes are taught reading, writing, arithmetic, English grammar, and geography; and Mr. Lamb, Professor of Logic and Languages, has opened a logical class, which is well attended. There is a good library, consisting of upwards of 400 well-selected volumes, on science, history, and biography. The library is open two nights a week; and it is the intention of the Committee to open a news-room in connection with the evening reading-room.

**Southampton.**—A highly interesting Lecture was delivered to the members of the Polytechnic Institution, on Wednesday evening, by Dr. J. Marshall, on "The Natural History of Man." The various opinions respecting the first creation and propagation of organised matter in general were considered. The characteristic distinctions of man were then pointed out, the lecturer dwelling particularly on the adaptation of his structure to the erect attitude, and on those noble (and almost Divine) attributes—Reason and Speech. Lastly, he spoke of the varieties of the human race; and after accounting for them on scientific principles, concluded a most able and instructive lecture by narrating several amusing anecdotes relative to the customs of the various inhabitants of different countries.

**St. Leonards-on-Sea.**—The Lecture Session of the Mechanics' Institution opened on Wednesday evening, Dec. 1st, with a very interesting Lecture on "Wonders of Vision." illustrated by a number of elaborate diagrams, by Mr. W. R. Selway, of London.

**Sudbury.**—At the Literary Institution, on the 30th ult., the Rev. E. Bull, M.A., delivered a very interesting Lecture on the "Progress of the Nation;" and on the 10th inst. the Rev. W. C. Roberts, M.A., gave a Lecture on "Italy and the Italians." Both lectures were well attended, and appeared to give great satisfaction. A drawing-class has recently been formed in connection with this Institution, which is progressing favourably.

Thame.—Mr. Miles has recently delivered two Lectures to the members of the Mutual Improvement Society, on "The History and Mechanism of Clocks and Watches." The lecturer exhibited clocks of different kinds, and explained their construction, and relative merits and defects. By this simple means, without the need of previous preparation, an interest was secured in the subject. This successful experiment, coupled with the difficulty of providing funds for the payment of lecturers, and the equal difficulty of men engaged in business giving much time to the preparation of gratuitous lectures, suggests the inquiry, Whether practical men, connected with different branches of the arts, might not frequently interest and instruct the members of Institutions in their special departments without much trouble to themselves?

York.—The Rev. E. Higginson, of Wakefield, recently delivered a Lecture at the Mechanics' Institute, entitled, "A Few Hints on the Art of Good Reading." He stated that reading should resemble, and ought not to be distinguishable from, good speaking or conversation, and that children should not be compelled to read or spell "great swelling words," but should be confined to that language which was natural and suitable to their infantile capacities. Good reading was essential in order to form an adequate conception, and to grasp the idea of the writer, which would otherwise be imperfect and unnatural.

## NOTICES TO CORRESPONDENTS.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings, are requested to forward them not later than Tuesday morning, or they will be too late for insertion in the following Friday's Journal.

*Subscribers to Journal.*—We cannot undertake to forward the Journal to unknown correspondents. In reply to a number of communications, we must state that it can be obtained through the usual trade channels.

*Members.*—Several Members of the Society have complained of not receiving the Journal. In every case, however, it has been found that they were duly delivered, and that the blame really rested with the Members' servants.

*Petitions.*—In answer to numerous inquiries as to the best time for presenting petitions to Parliament respecting the distribution of Parliamentary Reports, we have to state that any time during the next two months will do.

Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

## QUESTIONS FROM CORRESPONDENTS.

*Calf Leathers.*—Can you inform me where I can obtain a comparative statement of the cost and methods of treating calf-leathers in Europe and America? (No. 13.)

*Morocco.*—Is there any account published, which points out the relative qualities of French and English morocco, both as to softness, flexibility, perfection of colour, and durability in use? (No. 14.)

*Cements for Roads.*—Is there any cheap and efficient cement, which can be used for binding together the broken metal in Macadamized roads? (No. 15.)

*Marbling Slate.*—What is the nature of the process for marbling slate? (No. 16.)

*Drying Corn.*—Can you tell me where I can obtain a drawing and description of the most approved form of kiln for drying corn? (No. 17.)

## ANSWERS TO CORRESPONDENTS.

"*J. C. T., Thame,*" and "*G. B., Bristol.*"—Thanks for the printed copies of your Rules and Orders, sent in accordance with the letter of "P. S.," at page 32.

"*G. B. C., Woburn.*"—The parcels of books, &c., presented to Institutions, are sent out in the order of their joining the Union. You will receive yours in a few days.

"*J. R., Whitehaven.*"—The List of Institutions in Union was printed in the first Number of the Journal.

"*P. M., Brighton.*"—The Papers to be read at the next Meetings of the Society of Arts are always announced in the Journal.

"*J. H. B., Blandford,*" "*E. W. G., Newbury,*" "*F. P., Bakewell,*" "*T. H. A., Buntingford.*"—Certainly; forward your petitions to Parliament, they will be in very good time.

"*W. S., Morley.*"—To admit indiscriminately the Members of any Society to the meetings of the Council or Committee would never do; it is contrary to all experience in such matters.

## MISCELLANEA.

Gutta Percha.—M. Perrot, at a late meeting of the Paris Academy of Sciences, submitted some specimens of Gutta Percha, which he had purified to such an extent, and manufactured in such thin sheets as enabled him to use it as a substitute for paper, upon which he had taken impressions from the lithographic stone. One of the advantages which he stated this would possess over the ordinary paper impression was, that of enabling the reverse of any given object to be obtained, without the labour of redrawing it.

Manufacture of Sugar.—Mr. Bessemer's patent improvements in sugar manufacture promise to be of great value in the Colonies. It is stated, that by his new press the yield of juice is increased 50 per cent. over that produced in the ordinary cane-mills. He also proposes to do away with the vacuum pan, substituting in its place a very ingenious contrivance, in which an extended surface, kept constantly wetted with the juice, is exposed to a rapid current of warm dry air, urged by a common blowing-fan. By this means the juice is rapidly evaporated at a comparatively low temperature, and whilst the cost of the operation is lessened, the loss from the formation of molasses is likewise diminished. A third improvement consists in a new mode of washing and draining the sugar. A web of wire gauze is kept in motion, and the principle of atmospheric pressure is employed to render the drainage of the crystals rapid and perfect.

Iron in India.—There are extensive beds of rich iron ore and limestone in Kemaon, and abundance of timber for fuel. At present, however, these natural advantages appear to be wholly neglected. The ore contains about sixty per cent. of metal, but the native workmen are satisfied with a yield of nine per cent.; and the trees are cut down and left to rot on the ground, whilst only the smaller branches are converted into charcoal! The iron which is made, however, is of excellent quality.

Salt in Ireland.—A Company is about being formed in Belfast, with a capital of 50,000*l.*, to work the Salt-mines which have been discovered on the Marquis of Downshire's estate at Duncane. In connection with the preparation of the salt for commerce, chemical works are to be established, which will enable the Company not only to supply manufacturers with bleaching-materials, but to export them in large quantities to other countries. —*Mechanics' Magazine.*

The New Crystal Palace. — The Directors, amongst their many arrangements, have determined to appropriate a portion of the Building under the name of a "Court of Inventions," where Inventors, Patentees, and others, may exhibit their Inventions. The New Patent Law, by the principle of provisional protection from the date of application, gives Inventors great facilities for exhibiting and displaying their Inventions, and taking advantage of this arrangement.

New Green Dye.—M. Persoz has recently examined a new green dye received from China; it is perfectly distinct from Indigo, though resembling it, and is evidently of vegetable origin; the colours dyed with it are brilliant, and remarkably permanent.

Patent Law Amendment Act, 1852.—The members of the Society will be glad to learn that the Commissioners of Patents are taking steps for the formation of a Complete Index of Past Patents, available for consultation by the public. As a first step towards the attainment of this very desirable object, a Bill has been introduced into Parliament to enable the Commissioners to purchase certain Indexes of Specifications for 1,000*l.*, and to pay the purchase-money out of moneys arising from fees received on Patents. The Committee to whom the Bill has been referred have reported in favour of this provision. It is understood that the Indexes proposed to be purchased are very complete, and constructed on a principle offering very great facilities for consultation.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette*, 10*th Dec.*, 1852.

*Dated* 16*th Nov*, 1852.

767. J. Ramsbottom—Steam-engines.

*Dated 24th Nov.*

836. W. Oldham—Dibble-drill.
837. A. T. Forder—Fenders for railway carriages.
838. J. Carter—Articles of dress.
839. J. Higgin—Mordants.
840. J. Gedge—Incubator.
841. P. A. le Compte de Fontainemoreau—Machine for manufacturing fishing-nets.
842. A. Brackenbury—Electrifying-machine.
843. H. R. Caselli—Anchors.
844. R. Greenwood—Warming houses.
845. J. R. Cochrane—Figured Fabrics.
846. J. H. Combres—Preventing dampness in walls, &c.
847. H. Thomson—Apparatus for dyeing, &c.
848. C. Finlayson—Heating, drying, and ventilating.
849. A. J. L. H. T. Compte de Septeuil—Electro-magnetic engines and batteries.
850. W. H. Winchester—Splints.
851. W. Wilkinson—Looped and textile fabrics and machinery.
852. A. Joly—Steam-engines.
853. S. Spalding—Machine for pantiles.
854. E. Aitchison—Furnaces.
855. R. M. Glover—Coating ships' bottoms, &c.

*Dated 25th Nov.*

856. R. Dudgeon—Raising weights by portable hydraulic press.
858. J. Tatham and D. Cheetham—Machinery for doubling and spinning cotton, &c.
859. T. Bennett—Heating air for blast furnaces.
860. W. Hall—Rotary steam-engines and supplying boilers, &c.
861. J. Murdoch—Machine for shaping staves, &c. (A communication.)
862. A. Jeffrey—Reaping-machines.
863. H. Holland—Umbrellas and parasols.
864. M. F. J. Delafosse—Preserving wood, &c. (A communication.)
865. C. Harford—Rotatory engines.
866. J. Robertson—Furnaces and fireplaces.
867. C. Iles—Chimney-pieces.

*Dated 26th Nov.*

868. A. F. Remond—Improved lock.
869. A. Ogden and J. Ogden—Spinning cotton, &c.
870. J. W. Hoby and J. Kinniburgh—Metal castings.
871. J. Taylor—Docks for repairing and building ships.
872. A. E. L. Bellford—Bricks.
873. C. C. Glover—Stopping bottles for aërated liquids.
874. P. Sornani—Travelling-case.
875. A. J. C. Hudault—Leaven.
877. T. A. Cook—Bleaching.
878. C. Medwin—Water-gauges.
879. J. A. Oudart—Presses for copying letters.
880. A. Turiff—Moulding metals.
881. H. B. Condy—Acetic acid.
882. A. F. Cossus—Lubricating apparatus.
883. W. Massingham—Carriages and apparatus for carrying the dead.
884. R. B. Feather—Ships, and in rendering them shot-proof.
885. G. A. Huddart—Tools for cutting and abrading surfaces.
886. E. L. Brundage—Drawing off fluids from animal bodies. (A communication.)
887. T. Wood—Motive power.
888. G. A. Huddart—Combustion in boiler furnaces.
889. G. A. Huddart—Artificial flies.
890. M. J. P. Moriceau—Sharpening and dressing cards and clippers of shearing-machines.

*Dated 27th Nov.*

893. J. Lotsky—Pestalozzian gymnastic playthings.
894. W. J. Curtis—Tram-roads and carriages.
895. E. Martin—Extracting gluten from wheat, and preparing the same.
896. J. Gilmore—Extinguishing fire in ships.
897. G. Houghton—College caps.
898. W. E. Schottlander—Boring for drains and sewers, laying pipes and manufacture of same, and instruments for levelling. (A communication.)

*Dated 29th Nov.*

899. F. Westbrook—Clasps for books.
900. S. C. Lister and J. Warburton—Manufacture of yarn, &c.
901. T. Dudgeon—Hydrostatic propulsion.
902. W. Fowler and W. M'Collin—Clod-crusher.
903. W. Pink—Stirrup-bar for saddles.
904. E. Nicolle—Damping, cutting, and attaching stamps and labels.
905. M. S. Kendrick—Grates and fireplaces.
906. M. S. Kendrick—Lamps and burners.
907. J. D. Schneiter—Maps and charts.
908. F. W. Ellington—Screws for collapsible and other vessels.
909. W. Brown—Electric telegraph.

*From Gazette, 14th Dec.*

### WEEKLY LIST OF PATENTS SEALED.

William Hodgson, of Heircoat, in the County of York, engineer, for improvements in the manufacture of woven, textile, and looped fabrics, and in the machinery employed therein.

This patent, being opposed at the Great Seal Patent-office, was not sealed until Dec. 15, but bears date Sept. 30th last, the day on which it would have borne date but for the opposition it received by order of the Lord Chancellor.

77. Stephen Soulby, Ulverston, Lancaster.—Improvements in machinery for letter-press printing.
78. William Smith, Kettering, Northamptonshire. — Improvements in machinery or apparatus for cleaning currants, raisins, and other fruits and vegetable substances.
79. Henry Smith, Stamford, Lincolnshire.—Improvements in reaping-machines.
80. Matthias Walker, Horsham, Sussex.—Ash-pan, or apparatus for taking up cinders and ashes, and separating or sifting them.
150. Thomas Boyd, Glasgow, N.B.—Improvements in the treatment or finishing of woven fabrics.
193. Ralph Errington Ridley, Hexham, Northumberland.—Improvements in cutting and reaping-machines.
237. Herm, Jäger, Ludgate hill.—Improvements in the treatment of cotton, and other similar fabrics, by the introduction of chemical agents to supersede the use of dung in the dunging process.
290. William Horsfield, Swillington-mills, near Leeds.—Improvements in splitting, crushing, and grinding corn, seeds, grain, minerals, or other substances.
370. Robert Pinkney, 26, Long Acre.—Improvements in cases for holding marking materials.
380. Alfred Augustus de Reginald Hely, Cannon-row, Westminster.—Improved waiter, or tray.
407. Charles Henry Waring, Neath Abbey, Glamorgan.—Improvements in the cutting and working or quarrying of coal, stone, shale, clay, and other similar substances, and in machinery for that purpose.
409. Evan Leigh, Manchester.—Improvements in machinery or apparatus for carding cotton, and other fibrous materials.
423. Samuel Fletcher Cottam, Manchester.—Improvements in quarrying slate.
475. John Currie, Glasgow, N.B.—Improvements in grinding wheat and other substances, and in the treatment and preparation of such substances, and the products thereof.

### WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Dec. 9 | 3396 | Mitcheson's Registered Anchor. | W. Mitcheson & Sons | 18, Sise-lane, Queen-street. |
| ,, 10 | 3397 | The Registered Hackle. | John Worrall | Bernard-lane, Sheffield. |
| ,, ,, | 3398 | A Spinner's Bobbin-nail. | Thomas Carr | Chowbent, near Manchester. |
| ,, 13 | 3399 | Coat. | John Clent Boucher | Birmingham. |
| ,, 14 | 3400 | Improved Venetian Ventilator. | Fred. Johnson and Wm. Farrar | 16, Castle-street, Holborn. |

# SOCIETY OF ARTS.

## FRIDAY, DECEMBER 24th, 1852.

REPORT of the Council to the Members of the Society of Arts, Manufactures, and Commerce, upon the relation which the Second Report of Her Majesty's Commissioners for the Exhibition of 1851 bears to the general objects of the Society.

The Second Report of the Commissioners may be considered to consist of three portions:

1. An enumeration of the various institutions in London having the advancement of Art and Science for their object, with some remarks upon their present wants and deficiencies, including both those supported by national taxation and private enterprise.

2. A statement of the advantages the Commissioners consider might accrue from bringing these Institutions to the same locality, thus providing a common centre of action for the dissemination of a knowledge of Science and Art among all classes, on a scale commensurate with the importance of our country and of this metropolis.

3. The announcement of the purchase of a tract of ground at Kensington Gore, for the development of this scheme, the execution of the details of which are left to the voluntary efforts of the public.

It has been a very general opinion among the Members of the Society of Arts, that from its exertions in promoting the Exhibition, and in even calling the Royal Commission into existence, it had a right to share in the pecuniary success of the undertaking, and that some portion of the surplus funds would have been placed at its disposal. There is no reason to suppose that the claims of the Society have been overlooked. Their share in the great work of 1851 has been unreservedly recognized on all occasions. The President of the Commission has continued to take a most active interest in the proceedings of the Society; and the same may be said of other Commissioners who are also Members of the Society. No such grant has, however, been made; and notwithstanding the show of justice which may at first sight seem attached to the expectations alluded to, the Council think that the Society may perhaps continue to secure to itself a larger amount of public support and sympathy, by continuing to be dependent upon its own unaided exertions.

Far from tendering any assistance to the Society, it would seem as if the Commissioners were rather disposed *to seek that of the Society*, as will be seen by a brief summary of those portions of the Report which bear upon the Society of Arts, and which it is now the wish of the Council to bring under the notice of the members:

1. The union of Literary and Scientific Institutions and Mechanics' Institutes with the Society is mentioned as the practical fulfilment of a wish for improvement among the various institutions of the country; and this union it appears to be the wish of the Commissioners to foster and extend:

> "While the Mechanics' Institutes referred to have not only endeavoured of late years to extend their importance as institutions for systematic instruction, but have manifested a strong desire to enter into connection with a central Institution in London, as evinced at an important and influential meeting held at the Society of Arts, on the 18th of May last, which has resulted in the union of more than 220 institutions, numbering upwards of 90,000 members, all in correspondence with that Society."—Page 12.

A complete List of these Institutions is given in the Appendix (D) to their Report.

2. Most of the arguments in favour of the educational projects of the Commissioners are deduced from the Lectures delivered before this Society, extracts of which occupy pages 15, 16, and 17, of the Report.

3. The want of accommodation for this and other scientific Societies is alluded to at page 22 of the Report; but as the idea of providing such accommodation at Kensington Gore is thrown out in the light of a mere suggestion, and does not seem to require immediate attention, it is obviously inexpedient to discuss it at present, especially as it is not presented in a categorical form. The Council would, however, remind the Society, that as the lease of their premises expires in nine years, it may become desirable, at a future, and not very distant time, to consider how far the interests of the Society would be affected by the proposal.

4. The portion of the Report, however, which it behoves the Society most carefully to consider at the present time, is that relating to the intention of the Commissioners to promote the formation of a Trade Museum, in which samples of every kind of produce which becomes an article of commerce, either as an export or import, should be deposited for the benefit of the commercial and general public. The Commissioners devote pages 30 and 31 of their Report to a sketch of the principles upon which such an institution could be founded, looking to the "active co-operation" of the Society of Arts, as the means by which the project, which first originated in the Society, could now be realized. The following extracts are given, as bearing more especially upon the Society:

> "The Society of Arts, by its recent special exhibitions, which prepared the way for, and led directly to, the Great Exhibition of 1851, has been again moving in this direction; and Professor Solly, in the same Lecture, suggests the formation of a Trade Museum, in which the manufactures should be fully represented, as well as the materials which give origin to them.
>
> "The Trade Museum, so liberally presented by various exhibitors to the Commissioners, and the numerous promises of further contributions, added to the collection already possessed by the Society of Arts, and what we have reason to hope might be secured from its active co-operation, would form a nucleus of a very important character for a Museum of Manufactures worthy of this industrial country. Museums similar to that proposed exist in other countries, and are of much use, by enabling manufacturers to compare the respective excellences of production." Pages 30 and 31.

That such a Museum forms a most essential part of the plans of the Commissioners is shown from the suggestions which the Commissioners already offer as to the distribution of the ground they have purchased. At page 39, they suggest that the National Gallery might occupy the north boundary of the property, while the *Museum of Manufactures* occupied a corresponding situation on the south,—the two sides being devoted to the Departments of Practical Art and Practical Science; and this quite independently of the projected juxtaposition of the Societies to whom it is proposed to allot the centre of the quadrangle thus described. It is, therefore, evident, that it is competent for the Society to consider the question of the formation and management of the Museum alluded to, quite independently of the question of removing the offices or general business of the Society to the new site.

Successive Councils of the Society of Arts have felt the great want of a suitable building for holding occasional exhibitions of various special branches of industry; and there can be no doubt that if it should be shown to be feasible for the Society to undertake the duty proposed to them by the Commissioners, it would be quite possible, at the same time, to secure the space necessary for the special exhibitions alluded to, which would, indeed, completely harmonize with the general views of the Commissioners.

The Council would be glad, therefore, to receive from any gentleman, whether he be a Member of the Society or not, any suggestions upon the want, uses, and best organization of such a museum. The Council will, in the meantime, give the subject their most earnest attention; and should it appear to them that an institution of this description would really be as beneficial to the country as has been represented, they will consider it their duty to the Society and the Public, to enter into communication with the Commissioners as to the best means of carrying the project into effect.

In conclusion, the Council would call especial attention to one of the most important statements of the Commissioners, embodying a principle which, indeed, runs throughout the whole Report:

> "We propose to trust, for the carrying out of our plan, to the same principles which alone have rendered the execution of so large an undertaking as the Exhibition of 1851 possible, within so limited a time,—viz., the finding room and system, and leaving it to the voluntary efforts of individuals, corporations, and authorities, to carry out the promotion of the different interests with which they are themselves connected, on which they are dependent, and of which they are, therefore, the best guardians and judges."—Page 40.

The Council cannot but think that it is of happy augury for the projects of the Commissioners, that they thus freely and frankly commit their fulfilment to that very Public for whose benefit those projects have been devised; and by keeping this in view, whatever development the proposed institutions may take, they will be the growth of our own free English soil, and will deserve the same amount of support obtained from all parties and shades of opinion by the EXHIBITION of 1851.

By order of the Council,
EDWARD SOLLY,
*Secretary.*

## FIFTH ORDINARY MEETING,

*Wednesday, December 22nd,* 1852.

THE Fifth Ordinary Meeting of the Society was held on Wednesday, the 22nd instant; the Right Honourable Lord MONTEAGLE, Vice-President, in the Chair.

The Secretary announced that the Right Honourable the Secretary of State for the Colonies, had consented to forward the "Journal of the Society of Arts," free of expense, to the Colonies.

A Paper was read by Mr. Roger Fenton, "On the Present Position and Future Prospects of the Art of Photography," of which the following is an abstract.

It is thought advisable that at the opening of this the first public exhibition of photographic pictures, a short statement should be made of the present position and prospects of the art itself. The materials necessary to establish the dates, nature, and authors of the different discoveries by which it has been brought to its present position, have not yet been sufficiently examined and collated, for any history of photography to be given, which will not, from some quarter or other, provoke a protest. There is, however, one fact which no one disputes, viz., that the first practical combination of principles, for the most part previously known, and the first workable application of them to the production of sun-pictures upon paper, was made by Mr. Fox

Talbot. The step thus made was so great an advance, that its author is justly entitled to rank as inventor of photography upon paper.

It is said that, by a considerable part of the artistic body, it was received with distrust and apprehension. That the camera was looked upon as a kind of power-loom, which was to do away with hand-labour, or at least as a first step towards the making of pictures by machinery alone. It would be a most narrow view which could convert so faithful a servant as photography is to the artist, into a dangerous rival. If such a prejudice ever existed, it is, at present, a matter of tradition, and artists are now, as they ought to be, the most enthusiastic admirers, and, where they can afford the time, the most devoted practitioners of the art. They know that the camera will present them with the most faithful transcript of nature, with detail and breadth in equal perfection, while it will leave to them the exercise of judgment, the play of fancy, and the power of invention.

The progress made in the improvement of photography has been slow. In France, the efforts of those who studied the subject were directed exclusively towards the perfection of the daguerreotype. Partly from national rivalry, partly from the imperfection of the first pictures on paper, Mr. Talbot's discovery was slightingly spoken of. Latterly it has been studied with great perseverance and success. In England, its general use, and the progress of improvement, have been impeded by the existence of a patent, which happily now is almost entirely abandoned. During the last year and a half the art appears, in both countries, to have made rapid progress, and in both is due to the same cause—the impulse given by the Great Exhibition. This progress seems to consist principally in the augmented number of its students, and in their increased practical dexterity. New deoxidising agents have been brought into general use, and the surface of the paper has been rendered smoother and more glossy, so that it will take a sharper negative impression. Means have also been adopted for keeping it in a sensitive state for a longer time, uninjured. A new medium, collodion, variously modified, has been adopted, on which to receive the sun-pictures; a medium which possesses three most valuable properties,—great rapidity of impression, excellence in the picture produced, and the capability of receiving either a negative or positive picture, according to the intention of the operator; balanced by two disadvantages,—the necessity of employing so heavy and fragile a material as glass to receive the collodion film, and of performing consecutively all the different parts of the process.

A gradual but slow improvement has been made in the construction of lenses, principally consisting in the use of a kind of glass, that, in the passage of light through it, absorbs less of the chemical ray. In spite of many attempts to improve the camera, it is still the same clumsy, unmanageable affair that it has always been.

The improvements that have been made are, with one exception, that of collodion, rather those of detail than of first principle, and have been obtained more by rough experiment and by accidental discoveries, than by scientific research.

In the present Exhibition there are specimens of French, German, and English skill. The difference that prevails in the choice of subjects is most striking. The French pictures are of cities, fortresses, churches, palaces,—the living triumphs or the decaying monuments of man's genius and pride. The English are, for the most part, representations of the peaceful village; the unassuming church, among its tombstones and trees; the gnarled oak, standing alone in the forest; intricate mazes of tangled wood, reflected in some dark pool; shocks of corn, drooping with their weight of grain; the quiet stream, with its water-lilies and rustic bridge; the wild upland pass, with its foreground of crumbling rock and purple heather; or the still lake, so still that you must drop a stone into its surface before you can tell which is the real village on its margin, and which the reflection.

There is also a difference in the methods generally employed in the two countries. The best pictures received from France have been taken by means of albumen upon glass; and certainly nothing can surpass the brilliancy and harmony of their tone and the minuteness of detail. The best productions of English draftsmen, without reference to portraits, have been taken upon paper; and upon this medium there has been nothing, it is believed, produced which can surpass in delicate beauty or in grandeur some of the specimens exhibited. This conclusion is the more satisfactory, because it is admitted that the perfection of the paper process is the true point to which our efforts should be directed. We owe to the French the use of albumen upon glass, and the most perfect pictures that have been obtained by that process. It is to them, too, that we owe the improvement, if such it be,—a yet disputed question,—of the wax-paper process. According to the testimony of Mr. Stewart, in his letter in the *Athenæum*, it is to a member of the French Academy that we are indebted for what promises to be an important improvement,—the use of an air-pump to iodise and excite negative paper in vacuo. On the other hand, it is in England that a perfect negative picture, with the single lens, has been produced, in the shortest time; and here also what promises to be the *ne plus ultra* of photographic excellence, the collodion negative upon glass, has been discovered.

The United States possess a greater number of professional photographers than any other people; and it seems generally conceded that the finest daguerreotype pictures sent to the Great Exhibition were produced by them. If the photographs sent by German exhibitors were of inferior character, the specimens recently sent over show that the lessons learnt in 1851 have not been thrown away upon them. In Russia many amateurs are devoting their whole time to the art, and producing not unsuccessful results in the midst of difficulties enough to discourage the most enthusiastic student.

Though the excellence of the specimens now collected might allow photographers the indulgence of a little self-complacency, still everybody feels that as an art, it is yet in its infancy, and that the uses to which it may be applied will yet be multiplied tenfold. What practical use has yet been made of it in the artist's studio? Those natural attitudes of the human form which come unbidden, and which cannot be assumed, is there any pencil so rapid that it can depict them before meaning has departed from the pose? Is there any eye so true, any memory so faithful, that can mark and retain those delicate shades of difference which succeed one another in the human form, when it sinks back from intelligent movement into torpid inertness?

Foremost among the qualities whose rare union produces great success in art is the power of ready and accurate observation. The highest efforts of the time-honoured and consecrated princes of art are, so far as the expression of the different figures contained in them is concerned, and in all but their arrangement and composition, not creations, but remembrances. Those world-renowned pictures and statues, which have made their authors immortal, and have given pleasure to successive generations of admirers, is it certain that they gave the same pleasure to those who executed them? Doubtless they must have felt, however beautiful the result of their labours might be, it was infinitely below the image floating before their mental sight. And why? Is it not because of the difficulty of expressing the ideal by the material? Yet everything that is ideal, and that constitutes expression in the human form, is translated to us materially. Every disposition of mind has its bodily expression. As one mental phase succeeds another, so do their material formulas; if the first is rapid, so is the second fleeting and hard to define. Why should the artist then hesitate to make use of the best material means which he can find?

The apparent hesitation in making use of the art arises, in great part, from the present imperfect development of photographic knowledge. To be certain of producing a good picture requires, at present, an expense of time and thought, which those who wish to excel as artists can hardly spare. The chemistry of photography is as yet but partially understood; a few of the leading principles only are known. On this division of the subject much may be said that would be interesting and useful, but it would be out of the limits of the present paper. It is only within the last few months that photography has been extensively applied to the production of stereoscopic pictures; and even now, perhaps, not one in five of those who amuse themselves with the camera have ever tried to take one.

The present scientific and industrial applications of this art are, as yet, little more than indications of what will hereafter be done. We hear of the collodion plan being transferred from the glass to the wood engravers' block; of attempts being made by means of sensitive paper to record the pathways of the heavenly bodies, or to delineate in legible and lasting characters the minute wonders of microscopic creation. Among the pictures exhibited, there is a remarkable specimen of successful effort in this direction. It is also being used at this moment for the advancement of geographic research; photographic apparatus having been supplied to the vessels despatched to the Arctic Seas under Sir Edward Belcher, and to the "Herald," sent out under the command of Captain Denham, to examine the unexplored islands of the Pacific.

Its commercial and industrial use has hitherto been very limited; and before much progress can be made in this direction, more attention must be paid to a part of the process at present treated as one of secondary importance, — namely, the positive picture. According to the method generally employed, and which seems at present to give the best results, negative pictures can be copied with sufficient rapidity only on days of strong sunshine; and in order to produce rich tone and agreeable colour, each proof requires careful watching during the after process of fixing. To say nothing of the risk of injury to which the negative picture is exposed by careless manipulation, it is impossible at present to trust the re-production of the positive proof to less skilful hands than those employed in the creative branches of the art. Before sun-pictures can be extensively used in the production of letter-press, some method of copying them must be discovered, which shall produce as good or better results than the present one,—which shall be so simple in its manipulation that a workman of ordinary intelligence may be trusted to perform it,—and which shall not depend upon the state of the weather for its success. Of these conditions, the last is already fulfilled by the use of the negative Talbotype process in printing.

Before closing this brief survey, it will not be out of place to glance at the data which are necessary for the more rapid development of photographic knowledge. Is it yet ascertained what is the agent which produces the change in the salts of silver from which the sun-picture results? Is it light alone, or some agent accompanying, yet distinct, from the rays of light? If it be light alone, what are the causes which render its action so unequal at different seasons of the year, and at different times of the day? What is the effect of the extreme heat and cold in hastening or retaining photographic action? What influence is exercised by the electrical state of the atmosphere? Here are a few out of many problems requiring the closest observation, and long series of delicate experiments for their solution.

The chemical changes which take place in the several stages of a photographic picture require to be subjected to a more searching analysis. The refractive qualities of different transparent media, more or less adapted for the construction of lenses; the possibility of employing lenses that shall transmit only the chemical ray of the spectrum, the least advantage of which would be to save the cost of the present double achromatic combination; the possibility of constructing lenses of variable focus, by making the rays of light pass through fluids of different density, as suggested by Mr. Wheatstone; all these are subjects which demand and must receive investigation.

To the commercial principle just now beginning to be applied to this art, may be safely left the development and the reward of practical skill. But these more abstract questions will not be likely to receive the attention due to them, until photographers are united together in a society which shall give a systematic direction to their labours, and which shall keep a permanent record of the progressive steps from time to time, and of the authors of them. Such a society will be the reservoir to which will flow, and from which will be beneficially distributed, all the springs of knowledge at present wasting unproductively. Such a society is within one step of complete organization, and awaits only the general co-operation of the whole body of Photographers to enter upon an active and useful existence.

It was moved, seconded, and carried unanimously, that the best thanks of the meeting were due, and should be given to Mr. Fenton, for the interesting paper he had read.

The Chairman announced that the Exhibition of Recent Specimens of Photography, which they had met to inaugurate, would remain open for one week from this date, between ten o'clock and dusk.

Mr. Robert Stephenson, M.P., proposed, and the Rev. Dr. Booth seconded, a vote of thanks to the Chairman for his great kindness in presiding on the occasion; which was carried by acclamation.

## EXHIBITION OF RECENT SPECIMENS OF PHOTOGRAPHY.

It is proposed to return to this subject next week, then to describe more in detail the specimens exhibited, and the means and processes by which they have severally been obtained. We must not, however, omit to mention in this place, that the Society is indebted to the Messrs. Elkington for the very fine and unique collection of Gold and Silver Plate, exhibited at the opening *soirée*. In their productions there is always to be found a happy union of the most refined taste and the best workmanship.

## EXHIBITION OF INVENTIONS.

It is scarcely to be expected, that in an Exhibition of this character there should be found many specimens of Manufactures, which belong more properly to another and totally distinct series.

Perhaps the most important article of manufacture exhibited, and the one capable of most universal application, is a new artificial stone, or terra cotta, by Mr. J. M. Blashfield, which is burnt in the kiln without the usual "saggar," and is said not only to resist the action of the atmosphere, but also to become harder by exposure. It takes the sharpest outline and the boldest relief from the mould; the face being even in texture, and agreeable in colour. It will be remembered that there are serious objections to the ordinary artificial stones, in so far as their surface exfoliates, and changes colour after a time, in consequence of the chemical action due to the salts and alkalies used in their composition. The utility of a material of this kind for mouldings and for ornamental works, especially for gardens, cannot be denied; and supposing it to be produced at a cheap rate, there would unquestionably be a very large demand. Mr. Austin exhibits specimens of bricks for British bond, and for the formation of hollow walls, so as to admit of the escape of damp in thick walls, and to afford a ready means of effecting ventilation from all parts of a building. They are novel in form, and being dowel, or wedge-shaped on the base, will be found to make very strong work. This is a manufacture calling for great improvement; and now that the restrictive duty has been removed, and bricks may be made of any size, there is good reason for thinking that such will speedily take place. Several ornamental panels, painted by a new process, are sent by Mr. Froggott, being a new adaptation of colour to decorative purposes. Messrs. Hartly contributes several large sheets of rolled glass, which present a semi-opaque appearance, and can therefore be advantageously used for church-windows. Ribbed glass of this kind has also been employed for the windows of Gothic structures, in lieu of the small panes united by metal framework. There is this peculiarity about the ribbed glass, that the ribs, instead of obstructing the light, as it was thought they would, by collecting the rays absolutely increase it. Messrs. Cogan's dairy and horticultural glass, to which we referred last week, is also shown, with a very ingenious syphon for drawing off the milk from the cream, in place of the clumsy process of skimming. This syphon consists of a simple semi-circular tube, through which a piston works. One end of the syphon being placed in the vessel containing the new milk, and the piston being withdrawn, a vacuum is created, so that the milk flows through the pipe into a second vessel, leaving the cream behind.

Mr. C. A. Preller exhibits a series of seventeen specimens of leather tanned by a new process. The material employed for the tanning is of a peculiarly oily character, giving softness to the leather, while the original web-like fibrous texture is preserved. As no immersion in any liquid, for the purpose of being acted upon by tannic or other acid, is required, the leather will be found of greater density and durability than hitherto. Heat and damp do not make it hard and fleshy, and when exposed for several hours to the action of boiling water, it does not lose any of its pliability. In connection with this article, several specimens of improved saddlery, and of harness fastenings, the latter by Lott, Jewell, and Co., are shown. In the fastening, a slide-clasp is substituted for the ordinary buckle, by which the necessity for piercing holes, and thereby weakening the strap, is got rid of. Gutta percha goloshes, intended to hold chemicals in contact with the wounded parts of the feet of cattle, are shown by J. Jones and Co.

In miscellaneous manufactures and small-wares, Mr. Stephens exhibits an ever-pointed pencil, of novel and simple make. The case contains a spiral screw, which is acted upon by the cap when turned, and so drives forward the lead. The elastic surgical bandages for invalids, by Mr. Sparks, are intended to supersede the ordinary lace-stockings used by persons with weak limbs. In the basket-work shown by Mr. Emery, the novelty consists in the wicker sides being attached to a wooden bottom, giving increased durability. Mr. Simons exhibits many modifications of Palmer's candle-lamps, and their application to carriages and a variety of other purposes. The chief improvement consists in the application of a bayonet joint for holding the spring in its place, so that a candle may be easily inserted, without fear of its being broken; and a ready means afforded of learning the exact length remaining at any moment.

It is to be hoped that the efforts which have been made to lay before the Members and the public a faithful record of the inventive genius of the age may be attended with fruitful and favourable results; and that on the recurrence of each Yearly Exhibition, an epoch may be traced, as well in the history of the improvements of all articles of utility, and the means by which human labour may be economized, as in that of the Society itself.

## SUBJECTS FOR PREMIUMS.

We are reluctantly compelled to delay the publication of the third section of the Premium List until next week, owing to the pressing and important matter requiring immediate attention.

## COLONIAL CORRESPONDENCE.

### PLANTAIN FIBRE.

SEVERAL very interesting communications have recently been received from the West Indian Colonies, on the subject of Plantain fibre, its production, and its use as a substitute for flax. The subject is one of considerable importance, not only to holders of West Indian property, but also to manufacturers at home. It also possesses this further interest to mechanical men, that it is a matter especially in need of their practical advice and assistance, as the whole value of the fibre, as an article of trade hereafter, will depend on the mode in which it is prepared, and the economy and perfection of the machinery used in its extraction.

It has long been known that the stem of the West Indian plantain, or banana, contains a large quantity of a strong and serviceable fibre, suitable for many of the purposes to which flax and hemp are applied. Indeed, more than ninety years since, specimens of fustians and other fabrics, manufactured from this fibre, were presented to the Society, and are now in its collection: and in 1762, a premium was specially offered for the encouragement of this branch of colonial manufacture; but after a couple of years, no candidate appearing to claim the reward, it was discontinued. From that time to the present, various detached accounts are to be found respecting the fibre of the West Indian plantain; but its manufacture does not appear at any time to have been taken up on a large scale. A few years since, some excellent cloth, and also some remarkably good paper, were made at Paris from the fibre obtained from plantains which had grown there in the Jardin des Plantes: specimens of these were sent out to the West Indies. Good samples of plantain fibre were contributed to the Great Exhibition of 1851, by Messrs. Netscher and Davison, from British Guiana, accompanied by the statement that thousands of tons of the fibre, at present left to rot upon the ground where the stems are cut down, might be annually saved and exported, if a remunerative price could be obtained for it here. There appears to be no doubt that a fair remunerative price can be obtained for it, giving a profit both to the grower and the consumer.

The Hon. Mr. A. D. van der Gon Netscher, resident proprietor of the Klein Poudroyen plantation in Demerary, states, as the results of many years' experience on more than 400 acres of plantain plantation, that in every acre, on an average, at least 700 stems are cut down every year, the suckers being planted at regular distances of twelve feet by nine feet, which is the distance found most advantageous when the plant is cultivated for the sake of its fruit. If planted at distances of eight feet each way, and for the fibre alone, at least 1,400 stems per acre might be cut every year. In Mr. Netscher's plantation, the average weight of each plant was eighty pounds, and the yield of fibre from each was four pounds; but then, only about two and a half pounds were clean and good, the remainder being dirty and broken fibre, only suitable for the manufacture of paper. From these statements, it appears that nearly 60,000 lbs. of plantain stem is lost per acre every year in the plantain-fields; and, further, that this quantity of stem contains at least 3,000 lbs. of fibre. If the plant were cultivated solely for the sake of the fibre, nearly double the above amount would be obtained.

The specimens of plantain fibre shown in the Great Exhibition were of excellent quality, and probably worth from 40*l.* to 43*l.* per ton. As far as the fibre itself was concerned, it did not appear to be in any way inferior to the best Manilla hemp; and there is little doubt that, when well prepared, it would command a good price in the market, and find a ready sale. A good deal has been said and written about the importation of the Manilla plantain into the West Indies, though whether much good would be effected by doing so is very questionable. The fibre of the common banana, which flourishes there most abundantly, is an excellent article; and the object to be attained is not the introduction of any other plant, but rather the invention of a cheap and convenient mode of preparing the fibre from the one which is already abundant in several of the West Indian Colonies. Various ingenious mechanical arrangements have already been proposed for the preparation of plantain fibre, but for the most part they do not seem quite suited to the object in view. From the data already mentioned, and the very small per centage of fibre which the stem is said to contain, it is plain that a very large quantity of useless vegetable matter has to be removed. Now, in most of the machines hitherto devised, as the object has, of course, been to operate on the stems thoroughly and rapidly, the arrangement employed has been of such a kind as to crush them so completely as, in a great degree, to injure the fibre, and hence considerably deteriorate its value.

## HOME CORRESPONDENCE.

### MR. HUME, M.P., ON SUGAR DEFECATING AND COFFEE-GRINDING.

SIR,—I have received the list of *Subjects for Premiums* for the Session 1852—3, and regret that I am not in time to submit to the Society the importance of offering a premium for the best means of clearing cane juice from its impurities.

By the use of quicklime the deposit of the impurities from the cane juice has been generally made in our West Indian Colonies, but attended with a great loss of the saccharine matter; and as, of late, the use of a preparation of *lead* has been proposed to be applied for the purpose of *defecating*, or *depositing* the impurities from the cane juice, with a saving of twenty or thirty per cent of saccharine matter by that process, it seems of the greatest importance to ascertain if the lead can, by any subsequent process, be entirely removed from the cane juice; and then the discovery may be the means of saving the sugar colonies of this country from ruin.

The premium No. 59, in the Society's list, for "an account of recent improvements in the machinery and *processes* employed in the manufacture and preparation of sugar from sugar-cane," may comprehend what I mean; but the premium being entered under the head of machinery, it would, I submit, be necessary to add, "and any chemical process, or the use of any article by mixture with the cane juice, that would cause the *defecation*, or *purification* of the cane juice so as to produce the greatest proportion of the saccharine matter from the cane juice, pure and free from any deleterious article."

If the impression of the premiums is not yet thrown off, this explanation I propose might be added as a note to No. 59.

There is another premium which the late proceedings of Government render necessary, and which the Council might also add to the present list: viz., "For the simplest and most economic mill for grinding coffee."

The interference, by the Excise, with the sale of coffee, and of chicory, in upwards of 130,000 retail shops, under the plea that adulteration of coffee by chicory takes place, makes it of great importance to every consumer to have a simple and very economic *mill*, for the purpose of grinding the coffee berry; and, as the chicory can only be sold in separate packets, of mixing afterwards any proportion of chicory that may be approved of by each consumer.

I hope the Society will, though late, take means to assist our sugar-growers, and also to call out the inventive genius of our artizans, to obtain a simple and cheap coffee mill.

I remain, your obedient Servant,
JOSEPH HUME.

### MAIDENHEAD EXHIBITION.

Dec. 10th, 1852.

SIR,—The Secretary to our Mechanics' Institute has, I believe, forwarded you a copy of the "Reading Mercury," containing an account of the opening of the Maidenhead Exhibition of Works of Art, Industry, and Curiosity. The Exhibition is now closed, after remaining open for six days, or four more than were originally contemplated,—the extension having been made in consequence of the interest taken in it by the public.

A slight account of its origin and progress may, perhaps, be useful for the sake of those who may hereafter wish to engage in similar enterprises elsewhere.

That our little Exhibition was all that could be desired, is too much to say; but that it was more than could have been anticipated from the shortness of time allotted to its completion, its promoters feel pride in believing. A local Exhibition, properly speaking, should be made the means of calling forth local talent, of bringing into a focus and displaying the products, natural and artificial, of the surrounding districts. But to do this requires time; and this we did not allow ourselves, for the simple reason, that we did not at first contemplate an Exhibition of so ambitious a character, but merely proposed to collect a few objects of interest, to amuse the members of our Society at the Annual General Meeting. Circulars, however, inviting contributions, having been issued, and proffers and promises of assistance coming in, the original humble idea gradually expanded into the very gratifying exhibition which

**eventually took place; for gratifying it was in many respects, and in none more so than as showing how much could be effected in a right direction in a short period of time, and in a small provincial town, by the energy and perseverance of a few enterprising individuals. Not two months elapsed between the conception and completion of the undertaking: and, when it is considered that, through fear of not being able to collect a sufficient number of articles to fill the room (the Town-hall), the privilege of rejection was not exercised, it is surprising that so handsome a display should have been made; the effect of the inferior objects exhibited having been neutralized by the great number of the superior ones; such as pictures lent by the neighbouring gentry, china, and alabaster vases, statuettes, specimens of natural history, geology, and mineralogy. The few productions of local talent—necessarily few from the circumstance of the shortness of the time allowed for preparation—were highly creditable to the producers, and from the eagerness and curiosity with which everything was examined by hundreds of the humbler members of society, including the children of the National, British, and other Schools (not excepting that of the Union Workhouse), there is every reason to believe that much good will have resulted in quickened perception, increased information, and improved taste. May other provincial towns, benefiting by our experience and example, follow the one and improve upon the other, while we take an honest pride to ourselves as having been the first who have got up a successful Exhibition in so small a town as Maidenhead.**

**Your obedient Servant, LEON.**

### CONCERTS.

**SIR,—Last week I was called upon to pay the sum of 4*l*. 14*s*. 6*d*., as the expense of obtaining a license for our Institution so as to enable concerts and musical entertainments to be held in its hall and concert-room. This sum we have every year to contribute, and it is a tax which we think the Legislature never intended we should have to pay. I am anxious to hear, through your columns, whether we *legally* come under the operation of the 55th of George II., which was meant, evidently, to apply to public-houses; and if we do, whether some steps could not be taken by the Society of Arts to relieve us from this impost. Four guineas and a half spent in the purchase of books every year, would, in time, add considerably to our literary treasures. For some years we refrained from taking out the license, but being threatened with an information, we took legal advice upon the matter, and were strongly advised not to run the risk; the question was a very doubtful one, and might very likely be given against us, in which case we had no further remedy. P. P.**

## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ROYAL SCOTTISH SOCIETY OF ARTS. — The Society met in their Hall, 51, George-street, on Monday, the 13th instant, when, at the request of the Council, William Swan, Esq., F.R.S.E., gave an exposition of Eclipses, with an account of the remarkable phenomena observed at the total solar eclipses of 1842 and 1851.

Mr. Swan commenced by giving a popular explanation of the moon's motion, pointing out the conditions necessary for an eclipse to happen, and the circumstances which determine whether it is central or partial; or, in the case of a solar eclipse, whether it is total, partial, or annular. The curious adjustment of the periods of a *lunation*, of the revolution of the moon's *nodes*, and of the line of the *apsides*, was next described; owing to which, it was shown that after a period of about eighteen years and ten days, all eclipses recur in the same order, and nearly of the same magnitude. The remarkable fact that four total eclipses of the sun happen in the month of July in four periods of nine years —namely, the eclipses of 1833, July 17; 1842, July 8: 1851, July 28; and 1860, July 18; was thus explained. In describing a lunar eclipse, it was next shown how the atmosphere, by refracting the sun's rays, threw a portion of light into the earth's shadow; occasioning the bright copper-coloured light often reflected by the moon, even when totally eclipsed. Passing to the subject of solar eclipses, Mr. Swan gave an historical sketch of the more remarkable eclipses recorded as having happened in ancient times. Mr. Swan then referred to his memoirs on the eclipse of 1851, in "The Transactions of the Royal Society of Edinburgh;" and, for an extremely able and interesting account of the eclipse of 1842, he recommended the perusal of M. Arago's memoir in the *Annuaire* for 1846. He also urged upon all who could, to avail themselves of the opportunity of seeing a total eclipse of the sun, which would be afforded by the eclipse of 1860. That eclipse, it was stated, would be visible in the south of Spain; and if a station in the path of the moon's shadow could be at all easily obtained, Mr. Swan, from his own experience, could say that the eclipse, regarded merely as a grand spectacle, would amply repay the labour of the journey to see it.

INSTITUTION OF CIVIL ENGINEERS, Dec. 14th.— J. M. Rendel, Esq., President, in the chair. The discussion on Mr. Rawlinson's Paper "On the Drainage of Towns," was again resumed, and occupied the whole of the evening. It was admitted, by unquestionable practical authorities, that mere abstract principles did not hold good, in questions of the sewerage of towns, where so many local circumstances and domestic occurrences interfered with the perfect working of even the best designed general plan. There was no doubt that if pipe drains could be made sufficiently large and strong, and manageable, within a certain cost, they would be as good as brick sewers; but under the present circumstances, they were only fit to form the connections of houses, courts, and other small localities, with the main sewers, which should be constructed of brick, of such dimensions as to admit of easy internal inspection and repair, and be of such form, except where the flow of water was at all times considerable, that the radius of the curved bottom should be such as to gather a small supply of water into a sectional area, affording the same hydraulic mean depth as in a pipe drain, of a diameter merely adapted to discharge the minimum flow. The removal of obstacles, or accumulations, from the main sewers, by manual labour, was shown not to be more dangerous than the ordinary employment of most working engineers, or of men engaged in the execution of constructive works, and that it was a mere exhibition of false sentiment to put forward such an argument in favour of the introduction of pipe drainage.

Dec. 21st.—J. M. Rendel, Esq., President, in the chair. This was the Annual General Meeting for the election of the President, Vice-presidents, and other members of Council, for the ensuing year, and for receiving the Annual Report of the retiring Council. The Medals and Premiums which had been awarded were presented. The condition and progress of the Institution were described as most satisfactory, the expenses diminishing, so as to enable more volumes to be published, and the number of members, which now amounted to 746 of all classes, fast increasing. The following members were declared to form the Council for the ensuing year:—James M. Rendel, *President;* I. K. Brunel, J. Locke, M.P., J. Simpson, and R. Stephenson, M.P., *Vice-Presidents;* G. P. Bidder, J. Cubitt, J. E. Errington, J. Fowler, C. H. Gregory, J. Hawkshaw, J. R. M'Clean, C. May, J. Penn, and J. S. Russell, *Members;* and T. Brassey and T. R. Crampton, *Associates.*

## PROCEEDINGS OF INSTITUTIONS.

Ashford.—On Thursday and Friday, the 16th and 17th inst., Mr. Henry Nicholls gave two of his Shaksperean Readings to the Members of the Mechanics' Institute. The first evening was devoted to a selection from "Macbeth." The passages selected were given generally with great power, and evinced at once careful study and delicate appreciation of the great poet's meaning. The banquet scene, and that of *Lady Macbeth* walking in her sleep, elicited special marks of approbation. The next evening's entertainment consisted of the "First Part of Henry IV." Mr. Nicholls was very successful in the delineation of *Hotspur's* impetuous fiery temper, and the manner in which he coped with the great difficulties which must always attend the attempt to impersonate *Falstaff*, deserved great praise. *Prince Henry*, *Mrs. Quickly*, *Bardolph*, and *Poins*, were very well sustained, and the reading was throughout warmly applauded by a numerous audience.

Brighton.—A highly instructive Lecture on the "Wonders of Creation," was delivered to the Members of the Mechanics' Institution, by J. W. Clark, Esq., at the Town Hall, on Thursday, December 9th. The lecture was illustrated be several beautiful and appropriate Diagrams, and much information upon the important science of Geology was conveyed to an attentive assembly in a pleasing and succinct style.

Newbury.—On Tuesday, the 7th instant, Mr. Wheeler gave a Lecture to the Members of the Literary and Scientific Institution, on the "Telescope and its relation to Astronomy." The invention of the telescope appears to be due to two Dutchmen, Metius and Jansen, in the year 1590; and the application of the laws of light, and the principles of optics to the construction of instruments for viewing distant objects, was on this occasion divested of its technical abstruseness, and presented in a clear, intelligible and popular style. After giving a very lucid description of the number, sizes, and convexity of the lenses employed as eye-pieces, and other matters in reference to the subject of his lecture, Mr. Wheeler concluded with a notice of the popular fallacy (if such it may be termed), that the sun and moon appear larger when in the horizon (rising or setting) than they do when in the zenith, or intermediate altitudes, which he attributes to association, or the comparison of the orb with local objects, nearly in the same line of sight.

Portaferry.—On Friday evening last, Samuel Boyd, Esq., delivered the second of a Course of Lectures on "Animal Physiology," to the Members of the Mechanics' Institute; Joseph Wallace, Esq., President, in the chair. The subject of the lecture was the "Physiology of Respiration." After briefly reviewing his former lecture on "Circulation," the lecturer explained the mechanism of respiration in fishes, birds, reptiles, and mammalia. He then entered into an analysis of common air, and explained the changes it undergoes in the lungs, and concluded by pointing out the effects of breathing a vitiated atmosphere. This society is now in a very flourishing condition. The library is well stocked with books, and a daily reading-room is to be opened on the 1st of January, with a well-selected supply of newspapers and journals.

Southampton.—On Wednesday evening the Rev. A. McLaren, B.A., lectured to the members of the Polytechnic Institution, at the Victoria Rooms, on "The World's Teachers who have Profaned their Genius." The main purpose of the Lecture was to illustrate the principle that every blot in the moral nature reacted on the intellectual and artistic excellence of the teacher, welling up in foul streams of error in the reason and in the taste. The lives and characters of Byron, Burns, and Scott, were taken as illustrations of this truth; and it was shown how there was an exact parallel between what in their conduct and temper a plain man would pronounce wrong, and what in their books a critic, from a literary point of view, would pronounce defective. As a type of the converse of the same principle, the life of Milton came under consideration; it was regarded as a continuous protest against the notion that a poet is weak and slack-braced, and may be wicked. After some other illustrations, drawn from the lives of Coleridge and others, the Lecture was closed by an emphatic reiteration of the great truth of the sacredness of genius, and its necessary connection with goodness; and by considerations drawn from it of the dignity of literature and art, and of the spirit in which they should be pursued.

Stirling.—The opening Lecture of the Session in connexion with the "School of Arts" was delivered in the Court-house, on the evening of Friday, the 10th instant, by Charles F. Partington, Esq., London, "On the Crystal Palace as it was and as it is to be." The Lecturer illustrated, by means of diagrams and suitable experiments, many of the numerous inventions exhibited in the Great Exhibition.

Tonbridge.—The third Lecture of the present Session of the Literary Society was delivered on the 13th inst., by J. Gorham, Esq., M.R.C.S.L., "On the Application of Numbers in Physiology and Medicine." The application of mean numerical values in medical investigations was shown to be of the utmost importance, and it was stated that if the principles of calculation upon which the exact sciences were based were adopted in such investigations, that medicine itself would approximate to an exact science. This was illustrated by reference to the curve of viability, as deduced from the Northampton tables,—by curves of the pulse for all ages, from several authorities, as well as from three hundred original observations by the lecturer,—by anisothermal curves, or curves of unequal temperature, for the four seasons in different latitudes, in contradistinction to the isothermal lines of Humboldt,—the latter proving, by contrast, that the observation of Humboldt in reference to physical laws might eventually be found to apply to medical and physiological phenomena: "In all that is subject to motion and change in space, the ultimate aim, the very expression of physical laws, depend upon mean numerical values, which show us the constant amid change, and the stable amid apparent fluctuations of phenomena."

WAREHAM.—A Lecture was delivered in the Town Hall, on Wednesday evening, the 8th instant, by Mr. F. Chatterton, "On the Antiquity of the Harp." His remarks on the subject showed deep research, and were pointed and highly instructive. At intervals he performed several pieces of music, to illustrate the different portions of the history of the Harp, Miss Partridge assisting in the vocal parts. The audience was numerous, and appeared to be highly delighted with the entertainment.

WINDSOR AND ETON.—Mr. Wheeler delivered two highly interesting and attractive Lectures "On the Electric Telegraph, its Principles and Practical Use," on Wednesdays, December 1st and 8th. The Lectures were fully illustrated by well-executed diagrams, working models, and experiments; and technical terms being as much as possible avoided, the system of telegraphing by Electricity was made plain to the dullest comprehension. Mr. Wheeler commenced with a brief account of the early history and working of Telegraphs, and then proceeded to explain the nature both of frictional and voltaic Electricity. The deflection of the magnetic needle by Electrical currents, the various systems of working the Electric Telegraph, the different alphabets, the printing Telegraph, and all the other details, were then taken in order. Mr. Wheeler on both evenings contrived to rivet the attention of a crowded and miscellaneous audience for nearly two hours.

## NOTICES TO CORRESPONDENTS.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings, are requested to forward them not later than Tuesday morning, or they will be too late for insertion in the following Friday's Journal.

*Subscribers to Journal.*—We cannot undertake to forward the Journal to unknown correspondents. In reply to a number of communications, we must state that it can be obtained through the usual trade channels.

*Members.*—Several Members of the Society have complained of not receiving the Journal. In every case, however, it has been found that they were duly delivered, and that the blame really rested with the Members' servants.

*Petitions.*—In answer to numerous inquiries as to the best time for presenting petitions to Parliament respecting the distribution of Parliamentary Reports, we have to state that any time during the next six weeks will do.

Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

## ANSWERS TO CORRESPONDENTS.

*Steam-engines* (1).—"In reply to your Correspondent I beg leave to say that water, acted upon by a piston, and passing backward and forward through an orifice—the resistance to its passage increasing as the velocity accelerated—has been used for a long time as *a regulator of speed* for steam and other engines. It is also used to check the acceleration of trains of wagons down inclined planes, by an apparatus attached to the chain-wheel, including a cylinder and piston. Water has also been used to adjust the supply of steam admitted into the engine, by means of a small pump forcing the water under a ram, or weighted piston, something like that of a hydraulic press, there being a small hole in the cylinder capable of adjustment for the escape of the water. Air has been used in the same way." —J. G.

*Steam-engines* (1).—"A hydraulic governor for a steam-engine has been made in the following manner:—A small pump is connected to the engine, and delivers water into a cylinder provided with a loaded piston, or plunger. The throttle-valve of the engine is connected to the piston, or plunger. A small cock is inserted in the bottom or side of the cylinder, through which the water is allowed to escape and return into the cistern from which the small pump is supplied. Tho cock is adjusted so as to allow the water to escape as fast as the pump supplies it, when the engine is running at its proper speed. If the speed of the engine increases, the water is supplied faster than it escapes, and the piston rises and closes the throttle-valve. If, on the contrary, the speed of the engine decreases, the piston descends and opens the throttle-valve. The speed of the engine is altered, when required, by altering the opening of the cock."—C. C.

*Steam-engines* (1).—"A pneumatic governor for regulating the speed of steam-engines was shown in the Great Exhibition by Mr. H. J. Tuck, which has since been applied to an engine that was formerly on the Croydon Atmospheric Railway, and is now at work at a ship-building yard at Poplar, for sawing timber. It is easy of application, and pumps air, and therefore the joints, &c., are few and simple; not so with an hydraulic pump, pipes, and press." —M.

*Calf-leathers and Morocco:*—"Tell your Correspondents (Nos. 13 and 14) to consult the works of Davy, Sequin, De la Lande, Macbride, Deyeux, and Dr. Ure's 'Dictionary of Arts and Manufactures;' they each and all contain valuable information on the subject: indeed, all the Institutes in connection with our Society ought to have those works. If for details of manipulation, consult some intelligent furrier, fellmonger, and currier."—F. L.

*Gas* (6).—"The gas employed in many towns, and, I believe, in Edinburgh amongst others, is made from *cannel* coal, which yields better gas and more gas than the Newcastle coal generally employed in London. The Western Gas-light Company have been using cannel coal at their works at Kensall-green, and some of the other Gas Companies have also tried it. One objection to its use is, that the consumer pays more attention to the price per 1,000 feet than to the quantity of *light* which the 1,000 feet produce; he naturally objects to pay a higher price on account of improved quality, when the quality may be afterwards lowered to the common standard. In some towns the gas-works are the property of the Corporation, and a good quality of gas is maintained by the entire or partial use of cannel coal. Various attempts have lately been made to obtain a larger quantity of gas from cannel, and other similar rich coals, by decomposing steam by means of coke, and combining it with the cannel coal gas. The most economical mode of obtaining the largest quantity of *light* from coal has not yet been determined, and it will moreover vary in different localities. It must not be forgotten that the *coke* is a very important item in the account, and that a coal which may produce excellent gas may not always furnish a saleable coke. At the gas-works at Birmingham, it was the practice a few years ago, and may, perhaps, be so still, to import Welsh coal for making gas, because it furnished a coke of superior quality to that produced from the coal of the immediate neighbourhood."—C. C.

*Edinburgh Gas.*—"In answer to your correspondent (No. 6), permit me to say, that the cause of the superiority of the Edinburgh gas over that of London arises from two causes, viz.—First, from the difference of the coal used for the manufacture of gas. In Edinburgh, cannel coal is used, which generates gas of a highly-illuminating power. In London, Newcastle coal is used, which produces a very inferior quality of gas. In the second place, from the difference of the systems in use. In Scotland, the coal is only suffered to remain in the retorts a sufficient time to give out its gases, attention only being paid to the quality of the gas manufactured. In London, the coal is allowed to remain a much longer time in the retorts, and by excessive baking a very weak gas is generated, of little illuminating power, and of little value for lighting purposes; indeed, it is well known that in London they are coke and gas manufacturers,—in Edinburgh only gas manufacturers: the one manufacturing light gas the other gas light. Five feet of cannel coal gas will give twice as much light as ten feet of the ordinary London gas; consequently, at the same rate of charge per thousand cubic feet, the one costs only half as much to produce the same quantity of light; the products of combustion, and all the disagreeable attendants upon the use of poor gas, being lessened to a very great extent."—T. A. H.

*Yeast.*—"In answer to correspondent (No. 3), I have to say, that the bitterness extracted from the high-dried malt and extra quantity of hops used in the brewing of London porter (giving it its peculiar flavour), becomes imparted to the yeast of the London brewers, and bread made with this yeast is bitter and unpalatable. It is said, that by throwing the yeast into a vessel of water, and letting it stand for some hours, the bitterness is removed from the sediment, which is then fit for use. For the reasons above stated, bakers generally prefer yeast arising from weak ale and table-beer, in preference to that produced by the large porter brewers."—F.

*Stained Glass.*—"Your Correspondent (No. 10) inquires whether any attempts have been made to do away with the necessity of joining pieces of differently coloured glass in the production of stained glass windows? If he will examine almost any modern painted window, in which figures are introduced, he will find several colours on one piece of glass. It is true, that several small pieces are frequently used in order to imitate old windows; and also, when a *perfectly clear, transparent* colour is required, it is usual to insert a piece of 'pot-metal'—that is, glass made of materials which produce the required colour when melted in the pot. All shades, from lemon-yellow to orange-red, are, however, produced by covering the glass with a mixture of oxide or sulphuret of silver and Venetian red, and then heating it in a muffle. The Venetian-red is then scraped off, and the glass is found to be stained on the surface. By varying the proportions and the temperature of the muffle, various shades are produced. The other colours consist of fusible glasses, or enamels, which are ground up and applied with a brush, and then fired in the muffle so as to fuse and fix them on the sheet of glass. These colours, although transparent, have not the same polish and clearness as the pot-metal. One of the most beautiful paintings on glass in the Great Exhibition was painted on one sheet of glass: I allude to the picture of Lucia Mondella, by P. Balgatti-Valsecchi, of Milan. It was not adapted for a painted window, but was rather to be ranked with finished oil-paintings, having the advantage over a painting on canvas in the greater brilliancy produced by the admission of the light from behind. The reason of the decline of glass-painting, and all that is said about its being a 'lost art,' is not that our manufacturers cannot produce the requisite colours, or that they are defective in the mechanical part of the art, but simply that at the present time there is no adequate inducement offered to our first-rate artists to design glass windows; whereas, formerly, the best artists were employed, and some of the celebrated windows in the Netherlands were designed by Rubens. Many of our modern windows are much too highly elaborated; and although portions of the work look well in the manufactory, the effect of the whole, when viewed at a distance, is weak and poor."—C. C.

*Fluoric Acid* (9).—"A method of engraving on glass, by means of a substance which possesses none of the well-known pernicious effects of hydrofluoric acid, was discovered in Germany (about the year 1844, I believe) by two chemists simultaneously, Dr. Bromeis, of Hanau, and Dr. Böttger, of Frankfort-on-the-Maine. The latter gave an account of his invention, which he called *hyalography*, and its application *hyalotypy*, to the Physical Society of Frankfort. The process was then kept secret, but was to be divulged as soon as at least fifty persons in the Zollverein district should combine to purchase it. Whether that has been done, I am not able to say: it is a question of great interest to learn. The substance used for etching, it was stated, was perfectly harmless, and acted on the glass without evolving vapours or gases (like the recent processes for metallic etchings). It was also said that it did not lose its strength by use, and that the delicacy of its action was more perfect than that on steel or copper. If more information could be elicited it would be a great boon."—A. G. P.

*Fishing-nets.*—"I observe that one of your correspondents (No. 5) asks whether the American loom for weaving fishing-nets, brought to Liverpool in 1850, has yet been set up. Though I am unable to answer the precise question, the following may perhaps be interesting. Looms for weaving fishing-nets are no novelty; they were invented and used in England so far back as 1776, when Mr. Freestone invented a loom for that purpose. In 1795, Mr. Boswell, of Barnstaple, Devon, introduced a machine for a similar manufacture; the nets woven were such as are used in the herring fishery, and sixty-eight meshes were worked by one motion of the machine. The efficient working of the loom was attested by the Mayor and senior Alderman of the town. The same manufacture attracted further attention in 1804, when Mr. Robertson, a stocking-weaver of Edinburgh, submitted a model loom to the Highland Society of Scotland. This loom enabled the weaver to make 300 meshes in one minute; the loom itself being about three feet wide, and costing, at the date of its introduction, about 15*l*."—G. H.

## MISCELLANEA.

Diurnal Motion of the Earth.—Mr. Alfred Bird, of Birmingham, is now exhibiting, in the Philosophical Institution in that town, the Pendulum experiment which caused so much sensation in the scientific world some months back. He illustrates the theory by the usual means, a small ball being suspended over an imaginary point in an ordinary globe.

Discovery of Coal at Carrickfergus.—We have at length the gratification of learning that the spirited enterprise of the Marquis of Downshire, in working the Duncrue Mines, near Carrickfergus, has been rewarded with the discovery of its primary object, a seam of coal. After perforating the strata to an unusual depth, and in the course of a most patient exploration, meeting with an inexhaustible bed of fine rock salt, the miners have at length arrived at several layers of coal of a very superior quality, and have thus practically contradicted the conclusions of certain eminent geologists, who, at the meeting of the British Association here, in September last, seemed to consider the search for coal at Duncrue a chimerical pursuit.—*Belfast News Letter.*

Substitute for Guano.—At a Monthly Council of the Royal Agricultural Society, held at the Rooms of the Society, in Hanover-square, Lord Ashburton in the chair, a report on the subject of the Society's Prize for the discovery of a substitute for Peruvian Guano was adopted. The Society offer 1,000*l*., and the Gold Medal of the Society, as a prize for the discovery of a manure equal in its fertilizing properties to Peruvian Guano. The 1,000*l*. shall be offered in one undivided sum. No claim for the prize will be entertained, unless the claimant can satisfy the Council that an unlimited supply of the manure, at a price not exceeding five pounds per tôn, will at all times be within the reach of the agriculturists of the United Kingdom.

The Steam Jet.—Mr. Goldsworthy Gurney's plan for Ventilating Mines by means of the Steam Jet is now receiving a severe testing at the hands of a Committee of the Society of Mining Engineers, established at Newcastle. Objection has been taken to this invention that with it, as well as with the ordinary furnace, there was great liability to fire the mine, especially when it was placed, as is most usually the case, at the bottom of the shaft, so as to obtain the advantage of a long column of heated air. Mechanical contrivances are found fault with as not being continuous in their action, causing pulsations in the current of air. Of this class Struve's Pneumatic Machine, or Airometer, is perhaps the best, as it is stated to possess simplicity of action and capability of instant increased energy. There is a practical limit beyond which the exhausting process cannot be conveniently carried. It is now conceded that enlarging the air-passages, and splitting the air, on the "separation system," as it is called, is by far the better way of encountering the difficulty. Much may also be effected by a judicious system of winning arrangements, taking care that the upcast shaft is always sunk on the crop, so as to afford a natural vent for the light carburetted hydrogen, so injurious to the health and dangerous to the safety of the workmen.

## PATENT LAW AMENDMENT ACT, 1852.

It is understood that the Board of Trade and the Law Officers of the Crown have decided not to include the Colonies, or any of them, in any grant of Letters Patent.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette*, 17*th Dec.*, 1852.

*Dated 30th Oct*, 1852.

572. H. Brinstead—Shaking straw from thrashing-machines.

*Dated 9th Nov.*

684. T. Dunn and W. Watts—Construction of railways.

*Dated 19th Nov.*

784. R. Walker—Portable houses.

*Dated 27th Nov.*

891. H. Winton and F. Parkes—Agricultural forks, &c.

*Dated 30th Nov.*

911. J. Addison—Ascertaining time by pocket sun-dial.
912. W. Jeffs—Manufacturing letters, figures, &c.
913. J. Murdoch—Materials for painting.
914. J. M. Haldon—Rendering wood imperishable and uninflammable.
915. S. Clark—Improvements in lamps.
916. A. Craig—A crane.
917. J. B. and E. Birch—Forming drains and introducing pipes.
918. J. Skutchley—Mangles and mangle-rollers.
919. J. Barlow—Stands for barrels, &c.
920. T. Parramore and S. Lewis—Wearing apparel.
921. G. Fitt—Mechanical motive-power and speed.

*Dated 1st Dec.*

923. C. Hart—Thrashing-machine, &c.
924. W. Slater—Ovens and baking.
925. G. A. Huddart—Boilers and furnaces.
926. C. Walker—Purifying water in steam-boilers.
927. R. Milligan—Combing machinery.
928. W. Morris—Motive-power, &c.
929. F. W. Gareen—Propelling ships.

*Dated 2nd Dec.*

930. J. Dable and W. Wells—Rolling metals.
931. R. Kirke—Improved grate for burning anthracite, &c.
932. W. Taylor—Propelling ships.
933. J. Rothwell—Looms.
934. W. K. Whytehead—Steam-engines and boilers.
935. J. E. M'Connell—Locomotive-engines.
936. J. Norton—Shot or projectiles.
937. E. Poulson—Mechanical purchase for working ships' pumps, &c.
928. C. Millar—Timekeepers and clock-work.

*Dated 3rd Dec.*

930. J. Newall—Breaks.
940. N. Seward—Hydro-pneumatic agency for motive power.
941. T. C. Banfield—Process and apparatus for extracting saccharine from beet-root, &c.
942. P. and A. B. Walker—Fermenting ale and porter.
943. H. Hitchens and W. Batley—Production of raised surfaces, &c.
944. P. D. Woodcock—Wind pile.
945. C. De Bergue—Looms for weaving.
946. G. Ware and A. H. Fernandez—Wedges or keys for holding rails in chairs.
947. J. Neale—Back-fastenings for Venetian blinds, &c.
948. G. Stiff—Printing-machine.
949. J. Bethell—Machinery for digging, &c.
950. J. Bethell—Steam-engines.
951. A. Wall—Sheet-metal for shipbuilding.
952. D. M'Nee—Machine for printing on cloth and on paper with colours.
953. R. A. Brooman—Manufacture of sugar.
954. S. Neville—Lamp-glasses and globes.
955. W. Keates—Fire-boxes for locomotives, &c.

*Dated 4th Dec.*

956. J. T. Manifold and C. S. Lowndes—Method of extracting sugar from the cane.
957. J. Rowbotham—Timekeepers and check on watchmen.
958. A. Lawrie—Manufacture of oars, &c.
959. J. Murdoch—Galvanic battery.
960. J. Bentley—Fire-arms.
961. J. Cliff—Making and compressing bricks, &c.
962. W. Maugham—Rendering wood fireproof.
963. G. F. Parratt—Portable bridges or pontoons.
964. I. L. Pulvermacker—Pipes and cigar-holders.

*Dated 6th Dec.*

965. D. J. Murphy—Archimedean agricultural machine.
966. J. Buchanan—Treatment of flax, &c., and machinery.
967. R. A. Brooman—Saws and saw-mills.
968. G. F. De Doutret—Manufacture of alcoholic saccharine and starch products.
969. A. J. A. Gautier—Treatment of peat.
970. A. Lees and T. Kay—Machinery for spinning, &c.
971. T. M. Gooch—Railway signals and apparatus.
972. C. A. Jordery—Cravat collars and stocks.
973. R. Laming—Purifying gas and obtaining products.
974. E. Tucker—Manufacture of starch.
975. W. Paton—Driving bands
976. J. Norman—Making and setting square sails.
977. W. Blackett—Steam-boilers.
978. J. Smith—Paving roads, &c.
980. T. Conolly and W. Cotter—Propelling vessels.

*Dated 7th Dec.*

981. P. Duchamp—Improved Jacquard loom.
982. P. A. Le Comte de Fontaine Moreau—Bars of furnaces.
983. J. H. Johnson—Weaving carpets.
984. T. Challinor—Apparatus to be applied to decanters and other vessels for running of liquids.
985. W. Mayo—Ball or float-valves and cocks.
986. J. Norton—Transmitting motive power.
987. A. V. Newton—Conveyance of letters, &c., and passengers.
988. S. A. Goddard—Construction of pistols.
989. B. H. Brooman—Safety-valves.
990. R. A. Brooman—Heating, evaporating, torrefying, distilling, and refrigerating.

*Dated 8th Dec.*

991. T. L. Preston—Machine for making links for chains.
995. J., R., and A. S. Harrison—Manufacture of textile and other fabrics.
997. W. Baddeley—Conversion of rectilinear into circular motion.
999. T. Hill—Paddle-wheels for propelling.
1001. A. N. Groves and C. W. Finzell—Condensing steam.
1003. Sir J. P. Orde—Head-gear for horses, &c.

### APPLICATIONS WITH COMPLETE SPECIFICATION FILED.

994. H. Jenkins—Manufacture of bracelets, brooches, &c.—8th Dec.
1005. E. Kopp and F. A. Gatty—Printing or dyeing textile fabrics.—9th Dec.
1006. D. L. Price—Alarums and signals by electricity.—9th Dec.
1038. G. A. Everitt—Rolling metal strips for manufacture of wire.—13th Dec.
1051. J. Webb—Ornamenting enamel watch-dials.—14th Dec.

*From Gazette, 21st Dec.*

NONE.

## WEEKLY LIST OF PATENTS SEALED.

*Dated 18th Dec.*, 1852.

95. William Oxley, Manchester—Improvements in apparatus for heating and drying.
404. William Stevenson, Preston—Improvements in weft forks for power-looms.
463. William Harrison, Blackburn, Lancashire—Improvements in machinery or apparatus for sizing, and otherwise preparing cotton, wool, flax, and other warps for weaving.
502. Charles William Graham, Bishopsgate-street Within—Improvements in the manufacture of bottles and jars.
603. David Thomson, Dundee—Improvements in the manufacture of carpets.

*Dated 22nd Dec.*

103. Charles Langley, Poplar, Middlesex—Improvements in ship-building.
108. Thomas Fearn, Birmingham—Improvements in ornamenting metallic surfaces, and in machinery.
112. Herman Twick, Broad-street-buildings—Improvements in packing goods.
115. Charles John Carr, Belper, Derbyshire—Improvements in machinery for making bricks and other similar articles.
128. William Rogers, 125, Long-acre—Improvements in studs, buttons, and other fasteners.
309. James Yule, St. Luke's-terrace, Gloucester—Improved arrangement of sawing machinery.
360. George Lloyd, Budbrooke, Warwickshire—Improvements in the manufacture of paper.
395. John Geage, 4, Wellington-street South, Strand—Improved stove, or heating apparatus.

N.B.—The following were sealed under the old law:

Robert Burn, Edinburgh—A certain improvement in steam-engines, 21st Dec., six months.

Robert Galloway, Cartmel, Lancashire—Improvements in manufacturing and refining of sugar, 21st Dec., six months.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Dec. 21 | 3401 | Universal Portable Tent and Sleeping-cabin. | Hen. Harrison, sen. | King's-road, Hoxton. |
| ,, ,, | 3402 | Improved Æquimotion Spring. | W. and F. Thorn | 10, John-street, Oxford-street. coachbuilder. |

# SOCIETY OF ARTS.

## FRIDAY, DECEMBER 31st, 1852.

HAVING completed in the present Number the publication of the List of Subjects selected for Premiums during the present Session, it is confidently hoped that the invitation thus held out will be warmly responded to, by all who feel themselves capable of solving the difficulties, supplying the wants, and affording the information so suggested, or called for, by the Society. A hasty view of the field of invention and discovery can alone have originated that most mistaken but very general impression, which regards the different steps in the progress of the Arts as accidental, and made without much reference to the exigencies and necessities of life as they arise. Men talk of the great improvements which have been achieved in the processes of production, as if they mainly depended upon individual ingenuity developed by a happy chance, or unusual advantages of education; as if there was no natural law of progress illustrated therein, and as if the wants of mankind did not guide the labour of their hands. This Society by its constitution and objects holds a different faith. It believes in the regular sequence of Inventions, in the certainty with which the supply of discovery follows the demand for it, and in the vast importance of knowing and appreciating what our specific requirements are in each department of industry. The circulation of that knowledge renders the combined ingenuity of all classes of the community available for each branch of production, and brings to bear upon any point in the material world where a difficulty arises, the experience and the resources of the whole. So complicated and interwoven with each other have the multifarious arts of life become, that assistance in one often comes from the most unexpected quarters; and this Society finds no more useful scope for its labours than in carefully collecting each year a list of subjects which shall comprehend those wants, to the supply of which the minds of our practical men are most strenuously directed. It has at all times enjoyed peculiar facilities for doing so; but never in such abundance as now. An association of the kind necessarily comprises members eminent in every department of industry, and each willingly contributes his experience of what is most required in his line of occupation. That has always been the case, and by such aids the Society has, during the long period of a century, untiringly laboured to let all classes know the material requirements of each. But it had to struggle with many difficulties. No information of a comprehensive character existed on the useful arts. They had no literature, no philosophy, no countenance from our schools; and little but injudicious and hurtful interference from our statesmen. Men were learned in the specialities of production, but beyond them they knew little or nothing; and it has been reserved for the present day to discover as a popular fact the profound interest and charm which lie in the general study of that most varied and wonderful artificial system, which through the lapse of ages the industry of men has been slowly, laboriously, and humbly maturing. It is by Exhibitions—but more especially by the Great Exhibition of last year—that this discovery has at length been fully made, and its fruits, already visible in every direction, appear nowhere more conspicuous than in the increased facilities for usefulness thus afforded to this Society. The list of subjects for premiums is no longer a dubiously compiled document, put together on a very imperfect conception of the progress of the industrial world, and interesting only to the few. It is founded on a comprehensive survey of the whole field of human labour condensed into one view, for that among other purposes. By one effort we evoked the very Spirit of Industry, and compelled her to recount to us her wants. Men eminent in each branch of production investigated and sat in judgment upon the progress and requirements of their several specialities; and the whole results of their inquiries has been at length concentrated in one volume of Reports, which, whatever its defects in other respects, is the first comprehensive authority on the details of the artificial world. The importance of nearly all the subjects comprised in this list, renders any system of rewards in connection with it a matter of very secondary consequence; for where the urgent necessities of the day are continually pressing on men's minds the conviction that some new mode of accomplishing any given object must be discovered, no distinctions within the power of this Society to confer can increase the natural stimulus to exertion. The Society, however, can and does achieve a work of vast public value, in collecting and circulating a copious record of the desiderata of Industry; and in providing an unobjectionable ordeal wherein the follies or failures of Inventors may be criticised and corrected.

## EXHIBITION OF RECENT SPECIMENS OF PHOTOGRAPHY.

IN the last week's Number we promised to give a more detailed notice of the Photographic pictures, now being exhibited in the House of the

Society. Before passing them in critical review, it will perhaps be desirable for the sake of the general reader, to state shortly the principles upon which these pictures are produced, and the several modes in which those principles are applied.

The extent and the limits of the action of light upon material substances exposed to its influence, is as yet only partially explored: we know enough to suspect that it is almost universal. Its influence is shown in various ways,—sometimes in the change of relative position, which it produces among the component particles of one mass,—sometimes in the alteration of their chemical condition. Its action in both these modes may become apparent to the eye by a cotemporaneous change in colour, or may remain unseen until the application of other agents makes its existence evident. The salts of silver, and among them especially the nitrate of silver, are conspicuous for the sensitiveness which they display to the action of light; but more readily affected than any single salt of silver is the companionship of some other one with the nitrate. The change that appears to take place in the nature of two such minutely-divided salts, placed in intimate contact, is a precipitation of their metallic base, and a separation of the oxygen contained in the acids previously combined with it. In some of the arrangements, by which the nitrate is placed by the side of other salts of silver, the action of light will of itself entirely separate the metal and precipitate it in a pure state. In others it will only commence an action, which it requires other agents to complete.

For the production of pictures in the camera those salts of silver are generally chosen which are affected by the light in the manner last described. The reason is, that upon them the change, which may be afterwards developed to a greater extent, is produced by a very short exposure to the rays of light. In applying these principles to picture taking, the method usually employed is to precipitate iodide of silver upon the surface of smooth paper, which may be done in various ways, and to wash the paper, now said to be iodized, with a weak solution of nitrate of silver. The paper thus rendered sensitive to light, is placed in a camera provided with a lens, which throws up on its prepared surface a refracted image of the external objects in front of the lens. When the light is supposed to have produced a sufficient effect, the paper is washed with a solution of gallic acid, which continues the deoxidation, and combining with the silver set free, forms a black deposit—gallate of silver,—varying in intensity on each part of the paper, according to the quantity of light to which that part was exposed. It will then be seen that the sky, if it be a landscape that was before the lens, will be the darkest part of the picture. When the picture has been sufficiently developed, has been fixed by immersion in hypo-sulphate of soda, and properly washed, it then forms what is called the negative.

Pictures thus obtained are said to be produced by the ordinary Talbotype paper process. There are three other modifications of this method in general use, known by the names of the Wax paper, Albumen (both on glass and on paper), and the Collodion processes. The principle is the same in all. The difference consists either in the adoption of another material to contain the salts of silver, or in a different preparation of the same material. For example: in the wax paper process the material originally employed—paper, is saturated with wax before being iodized, with the view of obtaining an even and glossy surface, and, consequently, a more highly-defined image. It is with the same view that glass is made use of, and as it would not of itself retain in adhesion to it a coating of iodide of silver, it is first covered with a uniform layer of albumen, which will receive and retain the required salts of silver, and, when coagulated, is little affected by water; or the glass is covered with a film of gun-cotton, dissolved in ether, which, as the ether evaporates, forms a delicate and even surface, capable of receiving an impression equal in distinctness, and superior in gradation of tone, to those taken from albumen, with the additional advantage, owing, it is believed, to a yet unexplained action of the vapour of ether, of much greater sensitiveness to the action of light.

A picture obtained by any of these methods forms a kind of plate, from which, by laying it upon a piece of paper prepared by a modification of the same process, and allowing the rays of the sun to pass through it, there results an image of which the lights and shades correspond exactly with those of the original object placed in the first instance before the lens.

In the collection now exhibited in the rooms of the Society, there are excellent specimens of the capabilities of each method. The majority, and some of the very best, have been produced by the Talbotype paper process. For vigour of effect and general truthfulness, nothing can surpass the series of six pictures, exhibited by Mr. B. Turner, commencing with No. 175 in the Catalogue. Those who were assiduous attendants of the Crystal Palace will remember well the "Old Cottage," of Mr. Bingham. There are some pictures, contributed by Mr. Talbot, which are especially interesting as specimens of the perfection which was attained almost at the birth of the art. Two of them, Nos. 162 and 208, are placed in juxtaposition with pictures produced by Mr. Fenton and Mr. Delamotte, on wax paper and collodion respectively, and those who are curious enough to compare them closely will see that, if progress has been made, it is not so much in the perfection of the result, as in easier and surer modes of obtaining it. Remarkable for their delicacy and transparent atmospheric distance, are the works of Mr. Buckle and Mr. Rosling. In No. 246, "The Quadrangle of Arundel Castle," there is a bas relief, which, for the beauty of the half-tones, is scarcely surpassed by Mr. Delamotte's collodion picture on the right.

There are a great number of pictures, which, though deficient in excellence of execution, are exceedingly interesting from the judicious selection of their subject. To this class belong most of the contributions of Mr. Sherlock. So diligent a photographer as he has shown himself to be, deserves to have a better lens, or should have patience to make use of a smaller aperture. The same praise, as to choice of subject, must be awarded to Mr. Cocke and Mr. Shaw, especially to the latter, who, in his forest scenes, has successfully sought for the most agreeable combination of lines, and the most effective distribution of light and shade, which his subject could be made to present. Photographers will look with especial interest upon the picture of the interior of Redcliff Church, by Mr. Owen. Interiors are the stumbling-block of the photographic art. To have attempted them was a bold thing; to have succeeded is, therefore, so much the more a matter of congratulation.

The readers of the ATHENÆUM will feel some curiosity in examining Nos. 177 and 180, contributed by Mr. Stewart. They are remarkable for the perfection of their aërial perspective; but, though the distance is beautiful, the foregrounds and dark parts are not sufficiently made out. Some interesting pictures are sent by Mr. Jones and by Sir W. Newton. Those of the latter are worthy of notice, both from the goodness of the negative picture, and on account of the method on which they are printed.

Of pictures produced by the wax paper process, Mr. Fenton is the principal contributor. This process has as yet been too little experimented upon by practised photographers in England for any satisfactory opinion to be given as to its claim to superiority.

Of the use of albumen upon glass there are no examples by English artists. The few specimens that the Exhibition contains are the work of M. Ferrier, and most beautiful they are. Albumen upon paper has been very successfully employed by Mr. Goodeve, in Nos. 154 and 216. The same gentleman is also equally happy in the use of collodion. Most of the English glass pictures have been taken by this last method. Among the best of these are the landscapes and still life subjects of Mr. Delamotte; the portraits of Mr. Berger, especially one of that veteran photographer, Mr. Fry, No. 251; the portraits of Mr. Goodeve, and a remarkable collection of positive pictures on glass, the portraits of insane persons, taken by Dr. Diamond. There is a considerable number of photographs contributed by foreign artists. Some of these are interesting from their subjects, and attract attention from their size; but the great majority of those which are printed from paper negatives are opaque in the shadows, and without gradation of tones. The best of them are the Nubian Views, and these are the more interesting from the recollection of the difficulties under which they must have been executed.

The Views of Vienna, taken by Mr. Pretch, with a lens of Ross's, show great skill in manipulation.

The pictures upon collodion sent by foreign artists are by no means numerous, but it would be difficult to equal, and almost impossible to surpass them. They are the work of M. Constant, being principally views of Rome, and are much superior to the larger pictures, from albumenised glass negatives, contributed by Mr. Owen Jones.

We have taken a pretty comprehensive survey of the Photographic Exhibition; but there is one part of it to which no allusion has as yet been made. We refer to the series of pictures taken at the Great Exhibition for the Royal Commissioners. With the exception of those by Mr. Owen, they can scarcely be considered so meritorious as many others in the collection, to which we have previously referred.

At the soirée on the 22nd inst., in proposing a vote of thanks to Mr. Fenton, Mr. C. W. Dilke corroborated his statements with respect to the jealousy with which the French at first regarded the discoveries of Mr. Talbot, in the application of the photographic principle to paper, and also with respect to the little attention which, until very recently, they had paid to that branch of the art.

It should be stated that the Society is indebted to Mr. Joseph Cundall for the suggestion to hold a Photographic Exhibition; and that both to him, to Mr. Philip Delamotte, and to Mr. Fenton our, thanks are due for the valuable assistance they have rendered in procuring specimens and in arranging them in the rooms of the Society.

## EAST INDIAN EXHIBITION.

A FURTHER communication has been received from Dr. Alexander Hunter, of Madras, relative to this subject, in which he says:

"I have already collected a considerable variety of articles for the Exhibition which the Society proposes to hold in London next year. Amongst these are samples of the oils, fixed and volatile; papers; materials used for cordage; woods used for carving; varieties of arrow-root; gums, and gum resins. From the mineral kingdom I have a very large collection, embracing several useful series of substances; as an assortment of mineral colours in their raw and prepared state; a complete series of the ores of iron, manganese, lead, antimony, and copper; all the varieties of corundum and emery; a large collection of white and coloured kaolins; with all the clays and minerals employed in the manufactures of porcelain, stoneware, and common pottery; the materials for glass and enamel; the alkalies and materials used in making soap; the magnesian minerals used in the arts and manufactures; and an interesting series of gypsum fossils. In the artistic department, which has always been to me the most inviting, I have a very large collection of designs, native patterns, and Indian sketches, with some finished paintings in oil and water colours, which I propose to send to the Exhibition. I shall also send a very large and progressive series of instructions in every branch of art, amounting to about 2,000 lessons, studies, prints, and paintings of different kinds, which I have purchased or had executed for the use of the pupils in my School of Industrial Arts."

## SUBJECTS FOR PREMIUMS.

MANUFACTURES, which form the third section of the Premium List, is that to which our greatest efforts always have been, and will continue to be directed. This Society is the only centre which manufacturers have, and the pages of this Journal will be largely devoted to the advocacy of their interests, and to a record of their proceedings. It will be observed that the questions are mostly addressed to those branches of trade which have recently been, or which it is hoped shortly will be, relieved from the trammels of the Excise Laws. The baneful influence which these laws have exercised, and their hindrance to all progress, is notorious. They have prevented improvement by obliging manufacturers to follow a beaten track, neither deviating to the right nor to the left. Look, for instance, at the wonderful impulse which the glass manufacture has received since the duty was removed; and the immense numbers of new applications of which it has been found capable by an alteration in the processes of its manufacture. With regard to bricks, it is well known that full advantage could not be taken of the modern invention of hollow bricks so long as the law imposed a limit on their size. Now we may expect to see them assume a variety of novel forms, and to be applied in a manner and for purposes little before thought of. Ventilation is already being effected through their instrumentality. Paper and soap may also be cited as articles which it is believed would be greatly improved, and their use much extended, by the entire removal of all restrictive duties. Both articles are made almost entirely from refuse materials, both are sold at a comparatively small price, and in both therefore the removal of a duty which forms a large portion of that price would admit of improvements being made. It is scarcely necessary again to refer to the necessity for that freedom of communication, and interchange of thought and opinion, which form the life and soul of a Society like this. Where all is secrecy, there can be no improvement; and, besides, one's own selfish purpose is sure to be defeated by such a mode of procedure.

## CLASSES XI. TO XXIX.—MANUFACTURES.

### TEXTILE FABRICS.

74. For an account of the methods at present employed in the Manufacture of Paper, for the various purposes of art and commerce; especially such as may be used for Printing, Talbotype, and Water-marking.

Recently, a variety of mechanical improvements have been introduced, to meet the increasing demand for this article, consequent on the diffusion of knowledge. The unsuccessful attempts which have been made to produce paper from fresh materials, should not deter manufacturers from pressing the inquiry. Good photogenic paper is still a desideratum. This leads to the belief that chemistry has not been sufficiently studied in connection with this trade.

75. For a Method of more thoroughly Sizing Machine-made Papers with Animal Size.

Papers of this description are greasy under the pen, and cannot be written on so freely as those sized with farina and resin soap. They, however, bear the ink better, and are generally stronger and harder. It, therefore, seems desirable to retain the animal sizing, but an improvement in the process for effecting it is much wanted.

76. For an essay on the application of Indigo in the Printing of Calico, with special reference to new processes.

The process of dyeing with indigo consists in deoxidising it, or depriving it of a portion of its oxygen, when it assumes a green hue, becomes soluble in water, and then readily enters the pores of the cloth immersed in the indigo vat. When the cloth is properly saturated, it is exposed to the action of the air, and the indigo speedily re-absorbs oxygen, and again assumes its original colour.

77. For improvements in Surface Printing Washing Fabrics, by which body colours may be employed, without liability of removal by the action of fluids.

Some of the specimens shown in the Indian Department of the Great Exhibition possessed this peculiarity, which was supposed to be due to the preparation of the colour in combination with a solution of India rubber.

78. For an account of improvements in the methods of producing Ornamental Designs on Silks, Satins, and Damasks; the designs to be of greater length, and obtained at less cost than by the Jacquard Loom.

Some recent discoveries in France have shown that fabrics woven in certain colours may be made to assume an artistic design, by discharging portions of those colours, by means of sulphuretted hydrogen gas; the design itself being retained by blocks or cylinders pressed tightly on the surface of the fabric.

79. For an improved method of Bleaching Linen safely and rapidly, and without the necessity of any after exposure "on the green."

The necessity for boiling goods in order to prepare them for bleaching, has been proposed to be overcome by expelling the air from the fibres,—which is supposed to be the real obstacle,—by pressure within a cylinder, in lieu of the old process.

80. For an account of recent improvements in the manufacture of Carpeting by steam power, whether Brussels, Velvet-pile, or Terry; especially of processes by which the warp-threads are coloured to form the pattern before weaving. Also for the application of new materials in the manufacture, uniting durability, economy, and elegance of design.

Several patents have been taken out for the application of steam-power to carpet-weaving, and are now being successfully worked. Many plans have also been introduced for the preparation of the yarn previous to being woven, for printing the woven fabric, and in the method of treating the terry, or pile; all tending to cheapen and improve the manufacture, and to increase the facilities for producing artistic designs.

81. For improvements in the Manufacture of Embroidery by machinery, so that the production may more closely resemble that now made by hand.

In hand-loom weaving the usual method of producing patterns of this kind in light fabrics, is to throw across the entire net, from selvage to selvage; the silk consequently floats on the back of the cloth, from figure to figure, causing a great loss of valuable material. When the floating woof is cut off, which must always be the case with light fabrics, the figures, not having a sufficient hold upon the warp, are liable to open out.

82. For any improvement in the make, form, or material of Hats.

Of late years, many new materials have been employed in this manufacture, tending to reduce the weight, and improve its appearance. French plush is universally admitted to be superior in dye, texture, and finish.

### METALLIC, VITREOUS, AND CERAMIC MANUFACTURES.

83. For the invention of a good and cheap Lock, combining strength and great security from fraudulent attempts; cheapness, freedom from disarrangement by dirt, and requiring only a small key.

The deficiencies of some locks, and the dearness of others, renders this still a desideratum. Uniformity in the designs for locks, door-handles, finger-plates, and door furniture generally, is a point requiring attention.

84. For the best Essay on Ancient Goldsmiths' Work.

The chief defects at present experienced in connection with this art are the want of judgment in the selection of classic subjects, and of a sufficient knowledge of anatomy in treating them. Chasing in relief out of plate, either in medallion or in finish, combined with artistic effect, is still faulty and imperfect.

85. For an Essay on the combination of Engraving and Chasing, in connection with Electro-metallurgy, as applied to Art-manufactures.

It is considered that by uniting the two processes of Chasing and Engraving in the production of articles of *vertu*, and afterwards applying the process of Electrotyping, facilities would be afforded for multiplying designs, possessing greater boldness of relief and delicacy of finish, than those now made.

86. For any material improvement in the manufacture of Crown Glass, with special reference to transparency and durability of surface.

The German Crown Glass is said to be much superior to the English in this respect, being free from colour, and of great transparency. English glassmakers are in the habit of neutralising the colour, and so making it disappear in their samples; but edgeways the resulting gray becomes evident. Light is not so much absorbed by the glass itself as obstructed by the foreign matter in its composition.

87. For the discovery of any mode for increasing the depth, brilliancy, and durability of the Colours used in Painting on Glass, either by an improved process in vitrifying, or by any other means.

It is well known that pot-metal Glass, or the kind of stained Glass formerly used for cathedral windows, has deeper colours, and presents a much richer effect, than can be produced by painting the surface. Any discovery which would impart additional depth and durability to the colour of such glasses as are painted or stained after their fabrication, as well as any improved method of glazing or vitrifying the painted surface after the colour has been put on, would be in the highest degree valuable.

88. For the discovery of a cheap and effectual method of Uniting Pieces of Coloured Glass, so as to supersede the use of lead joints, or other unsightly modes of joining, in the construction of Stained Glass Windows.

Considerable difficulty has attended the carrying out of a plan some time back proposed for this purpose, owing to the extreme brittleness which is communicated to the Glass when heated a second time, and from other causes. By avoiding the use of the slips of lead, for holding together differently coloured pieces of Glass, the appearance of windows of this kind might be improved, and greater scope and freedom afforted to the artist.

89. For a cheap and simple method of Casting Glass Pipes, for Draining, and other similar purposes.

It is said that at Maestricht, in Holland, Glass Pipes are now used in place of iron, for the conveyance of gas. An easy method of joining pipes of this material, so as to make them capable of resisting the pressure of water, and of being used for its conveyance, as well as for sewerage, is an object of great importance.

90. For the best account of the causes of the defects in Flint Glass, with the means which have been employed to remedy the same, accompanied by suggestions for the improvement of the manufacture.

It has been found that by covering the iron rod used for mixing the fluid metal in the pot with an earthen shield, discolouration and striæ are prevented.

91. For a method of producing large pieces of Glass, free from veins, perfectly homogeneous, and suitable for Optical Purposes.

A perfectly sound and durable surface, which shall not exude the alkali, so as to leave the Glass porous, is absolutely essential for optical or chemical purposes. Glass cannot be homogeneous that exudes any of its component parts.

92. For an Achromatic Lens, not less than three feet focus, capable of being used as quickly as smaller lenses, and suitable for Photographic purposes.

It is the want of homogeneity which prevents the manufacture of large achromatic lenses. The attempts to overcome this defect have been but partially successful, and it is to be feared that perfect homogeneity in glass will not be attained, as Dr. Faraday has shown that even water, upon becoming ice, often contains striæ.

93. For any important improvement in the construction of Kilns for Firing, or Baking Parian, China, and Earthenware.

It is well known that from the peculiar composition of Parian, large numbers of figures are spoilt in the kilns. The material itself is subject to great shrinkage, so that every part of an article submitted to the fire has to be carefully and accurately supported by a definite quantity of the same material, in order that the relative proportions of all the parts in the original model may appear in the finished manufacture. Perhaps it is equally important to improve the material, as the means employed for firing it.

94. For an account of improvements in the material and processes for Glazing Earthenware and China.

Lead has been used for giving a ready flow to the glaze, but is objected to, on account of its seriously affecting the health of the workmen. Although several plans have been proposed for superseding it, they have been found to act prejudicially on the colours and tints of colours used for giving effect to artistic designs.

## MISCELLANEOUS MANUFACTURES.

95. For an essay on Architectural and Decorative Ornaments; the materials employed, their mode of manufacture, and the comparative cost of production.

Cement, leather, gutta-percha, cannabic composition, and a vast variety of other articles, are used for this purpose. But there scarcely appears to be any rule by which the adoption of one or the other is regulated. It is essential that a comparison should be made between them, so as to enable a decision to be arrived at as to which is the best, most economical, and most appropriate material to use under certain definite conditions.

96. For an essay on the best examples of Modern Furniture in various materials, exhibiting sound principles of construction, in combination with decorative art.

Since the introduction of papier maché and iron for articles of furniture, it has become extremely desirable that in applying the former the principles of construction on which strength depends should not be lost sight of, while with the latter attempts should not be made to produce foliated or sharp projecting angles.

97. For a means of "patching the sieve" used by Block Paper Stainers, without manual labour.

This work is at present performed by boys in England, and by girls in France. It is a purely mechanical operation, so that there is no reason why machinery should not be made to take the place of hand labour.

98. For an account of improvements in Printing Paper Hangings by machinery, by which solid ground, or other colours may be laid, and the objections at present existing to the use of size may be overcome.

The difficulties experienced in connection with machine-made Paper Hangings, is that of obtaining clear solid colours, evenly distributed, and with great rapidity, as the cylinders do not take up the colours fast enough.

99. For the invention of an Artificial Stone, or Terra Cotta, free from the objections to which all such substances are now liable.

The best kinds of Artificial Stone at present known become decomposed on exposure to the atmosphere, owing to the efflorescence of the salts employed in their manufacture, so that the appearance of the work is completely destroyed.

100. For an account of any material improvement in the Moulding, Burning, or general Manufacture of Bricks; the chief qualities required being strength, indestructibility, and cheapness.

The mode in which this operation is carried on, even at the present day, is of the rudest kind. By the present system bricks are badly moulded and ill burnt; and the result is a material possessing few conditions of durability, or the power of resisting moisture. Machines for making bricks have hitherto been attended with very partial success; and the problem yet remains to be solved whether by the aid of machines or otherwise, bricks can be manufactured good in colour, light in weight, impervious to moisture, and possessing the essentials of durability, without sacrificing the principle of economy. The question of hollow bricks must of course form part of the inquiry, especially in reference to their economic employment in the dwellings of the labouring classes.

101. For an account of improved modes of treating and applying Gutta Percha, so as to render it less liable to be acted upon by changes of temperature.

This substance is yet new to commerce and the manufacturer; but the enormous extension of its application to various purposes of use and ornament appears to promise a still greater degree of commercial pre-eminence, and to justify the belief that many improvements will be made to meet the increased demand.

102. For the best account of the most recent applications of new materials and processes in the Manufacture of Soap.

The heavy restrictive duties, and the excise laws to which this article is subject, have impeded, and still tend to prevent any alteration in the materials and processes used in its production. Within the last few days ten tons of the oil of the *Bassia Latifolia*,—a tree indigenous to India, and first brought to the notice of the public through this Society, in 1849,—has been received for the purpose of testing the capability of its application to this manufacture. Recently, too, a cargo of crab oil obtained from the *Carapa Guianensis* has been imported into England from British Guiana.

103. For the invention of a good and cheap Candle for the use of Miners; to have a high melting point, and not be liable to waste or gutter.

Candles for this purpose should be capable of resisting rough usage, and the effects of heavy wet clay put round to hold them. They should not be liable to be blown out by draughts, or to be melted at high temperatures, to which they are submitted in some parts of the mine.

104. For the invention of a good and cheap Bedroom Candle, requiring no snuffing, and not liable to gutter or drip when carried about.

Until the use of gas becomes more general in private houses, as in Edinburgh, this will be recognized as an important article of domestic use, requiring and capable of great improvement.

105. For the best account and collection of specimens of the various materials and processes employed in the production of Artificial Flowers.

In the manufacture of Artificial Flowers, many different materials, as cambric, feathers, &c., are employed, each requiring a different treatment, and a more than usual amount of skill in the imitation of natural texture. In addition to durability, the advantageous application of varied materials, and, finally, cheapness of production, have to be considered.

At its Institution the Society of Arts was the sole public body specially encouraging the Fine Arts. Within its walls the first meeting of the Royal Academy took place. The Department of Practical Art has received its present form greatly in consequence of the Exhibition of 1851, in which the Society was an active agent. These and other Institutions occupy much of the ground originally taken up by the Society, and many of its objects of encouragement in art are thus adequately fostered.

The Society, in consequence, would seek to reward in art those objects not already provided for. It desires to encourage Design in "Pure Outline" of poetic and historic subjects; any specimens of which will meet with its careful consideration. It also desires to call forth an union of scientific and artistic delineation much wanted for the illustration of educational works and lectures. It will also have much pleasure in rewarding any novel and beautiful design in art adapted for manufacture, of which the subject may not be specially, by name, comprised in any contemporary list of subjects for premiums put forth by any other Institution.

The following List (without restricting competition to the examples given) points to the class of subjects in outline and "scientific delineation" in which the Society desires to reward excellence. In art design for manufacture, the candidate will find reward open, in directions not noticed by other lists of subjects for premiums.

## CLASS XXX.—FINE ARTS.

106. For the best series of four Outline Drawings in illustration of the Approach of Night, as described in Petrarch's third Ode, commencing with, "Nella stagion che 'l ciel rapido inclina." *

107. For the best series of four Botanical and Structural Drawings of a Forest-tree.

108. For the best series of four Botanical and Structural Drawings of one of the Cerealia.

109. For the best series of four coloured Botanical and Structural Drawings of any well-known English Plant.

110. For the best series of four Drawings of any Animal, displaying its anatomy.

111. For the best series of four large Drawings or Diagrams, suitable for Lecturers, in illustration of any special branch of Natural History, as the Hemp or the Flax-plant, the Silk-worm, the Cochineal Insect, &c.; the above drawings to be of sizes proper for lecture illustration.

112. For the best series of four large Drawings, or Diagrams, suitable for Lecturers, in illustration of any piece of Machinery, as a Loom, Steam Press, Paper Engine, &c.; each drawing to be not less than three feet by four feet.

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* In the London edition of 1784, this line occurs at the commencement of the ninth canto; and in the Paris edition of 1836, of the fifth canto.

It should be stated that the Society in all cases expressly reserves the power of rewarding each communication in proportion to its merit, or even of withholding the Premium altogether. In regard to Colonial Produce of all kinds, it is absolutely necessary that a certificate from the Governor, or other qualified person, should accompany the samples sent to the Society, certifying that they really are the produce of the particular district referred to. The samples should be sufficient in quantity to enable experiments to be made, and an opinion to be formed of their quality. Cotton should be sent both in seed and picked. Flax should be accompanied by a description of the culture, the nature of the soil, the weight of the produce per acre, and the extent to which it is cultivated in the particular district. Silk, by a description of the method by which the silkworms were managed; of the kind of trees or plants on which they were fed, and particulars respecting the culture of such trees and plants. Wine, by an accurate description of the vineyards from whence produced. In every instance the maximum extent of the plantation from which the produce has been taken must be stated; with the average yield obtained, and whether similar articles have hitherto been exported from the Colony, or not, and in what quantities. All communications, and articles intended for competition, must be delivered to the Secretary, at the Society's house, where copies of the Premium List, and any further information, may be obtained, free of expense, on or before the 31st of March, 1853. This restriction, as to the date of receipt, does not apply to articles of Colonial produce.

## COLONIAL CORRESPONDENCE.

### COFFEE-CURING.

Two medals have recently been awarded for subjects of importance connected with the Colonies, the one to Dr. Edward Stolle, of Berlin, for his Essay on the Manufacture of Sugar; and the other to Mr. W. Clerichew, of the Rathoongodde Plantation, in Ceylon, for his Improvements in the curing of Coffee. In the former case, the paper in question was originally sent to the Society in competition for the medal specially offered by His Royal Highness, the President, for the best essay on the manufacture of sugar, but it arrived too late,—not being received in fact till the medal had already been awarded to another competitor. Nevertheless, Dr. Stolle's paper was referred to a Committee, and having been very favourably reported on as highly deserving of reward, it was decided that the large Medal of the Society should be presented to him. Upon this decision being communicated to the President, he was graciously pleased to desire that a duplicate of his own special Medal should be presented to Dr. Stolle instead of the ordinary Medal of the Society; and this has accordingly been done.

In order to explain the precise nature of the improvements which Mr. Clerichew has introduced in the curing of coffee, it will perhaps be most convenient to give a brief abstract of parts of his elaborate communication on the subject. The ordinary process of curing coffee consists of several operations; in the first place, the ripe fruit when picked has to be "pulped," the outer soft fleshy covering being thereby removed from the true berry, or seed, which is then left covered by a thin skin called the parchment, and more or less contaminated with mucilage. In order to remove this, the berries are allowed to remain for about twenty-four hours in a suitable cistern till fermentation has commenced; the cistern is then filled with water, and the whole is well stirred up with wooden rakes, till the mucilage is entirely separated. The third and last part of the process consists in drying the coffee; and the success with which this is effected depends in a great measure upon the comparative dryness or moisture of the season. In moist weather the berry is very apt to become mouldy, or even to heat, and undergo partial putrefaction. In order to prevent these very injurious consequences, coffee-curers are in the habit of turning over the berries by the manual labour of relays of Coolies working night and day—the evil is thus checked and diminished; but when once fermentation has commenced, it is never wholly stopped, and the value of the coffee is always lessened.

The worth of coffee, as an article of commerce, is lessened in proportion to the extent to which fermentation has been allowed to proceed. If heating has taken place, the bean never afterwards acquires that pellucid appearance and colour which is indicative of well-cured coffee. If mouldiness has commenced, the aromatic flavour is invariably injured; and if this is allowed to proceed to a state of incipient putrefaction, the coffee assumes a dull black colour, and is then entirely destitute of value. The difficulty of curing coffee is increased by the fact that it generally has to be done during the prevalence of the periodical rains, and therefore when the atmosphere is loaded with moisture.

From long experience of the difficulties attending the old modes of curing coffee, and from a careful consideration of the causes which led to its injury whilst drying, Mr. Clerichew was induced to try and introduec an improved process. It occurred to him that if it was possible by means of revolving fans to establish currents of air throughout the whole mass of the coffee to be dried, spread upon perforated floors, the chief source of evil, the stagnation of damp air between the berries, would be obviated. This plan was put in operation in 1849, and was found perfectly to answer the inventor's expectations.

Mr. Clerichew has submitted to the Society a full account of the mills, machinery, and drying-houses erected on the Rathoongodde estate, accompanied by a series of carefully executed drawings. The floors of the curing-houses are covered with laths two inches apart, over which an open coir matting is stretched; the roofs are covered with felt, or thin sheet-iron, and, being thin, the temperature of the air in the upper part on a fine day is often raised to as much as 120° from the heat of the sun. Stoves are placed in the lower floors of the drying-houses: and in these the coffee when brought from the pulping and washing-cisterns, is, in the first instance, partially dried; when by the application of artificial heat the surface-water has been carried off, the coffee is removed into the upper floors, and its drying completed by the aid of natural heat.

Several different contrivances have been already suggested and applied in Ceylon, in which furnaces or stoves are employed to aid in the drying of the coffee; but in none of these the constant and regular circulation of the heated air through the mass of the coffee was introduced. In Mr. Clerichew's arrangement, the heated air is introduced underneath the floors of the drying-chambers, and drawn through the coffee, which is spread over them, by means of a series of powerful revolving fans. By altering the size and number of the fans, by increasing or diminishing the velocity with which they are made to revolve, and by closing or opening various apertures in the sides and upper part of the buildings, the drying of the coffee may be accelerated or retarded at pleasure. In very wet seasons it is difficult even in this mode of curing coffee to dry the berries,—the process is slow and very tedious; but even under these circumstances it keeps perfectly sweet and fresh, requires no hand labour, and does not acquire any mouldy flavour.

From the evidence brought before the Society, it appears that the improvement introduced by Mr. Clerichew perfectly answers the object for which it was intended, and that the coffee cured by his process is of very superior quality. It is right to state, that as far as regards the question of originality, the claims of several inventors may be raised in opposition to that of Mr. Clerichew, for a somewhat similar process has several times been suggested,—as for example by Mr. Davison, in his patent taken out in 1843, which was described in a paper read before the Society in April, 1847. Nevertheless, as Mr. Clerichew seems to have been the first practically to apply these principles to the curing of coffee, and as the arrangements which he has adopted are highly ingenious and complete, the Society determined to testify their approbation by presenting to him their medal.

## HOME CORRESPONDENCE.

### PEOPLES' COLLEGES.

*Sheffield.*

SIR,—As there have been several references to "Peoples Colleges" in the preceding Numbers of the Journal, I think a few remarks concerning our College here, its objects, and the mode in which it is managed, will be interesting to many of your readers. The basis of the People's College is a most popular one; as the name implies, it is *for* and *by the People*; and it aims to be, according to its name, a *College*. The list of classes is subject to periodical revision; and while attention is constantly paid to the general branches of instruction that come within the popular reach, it will also be perceived that the more advanced studies are not neglected, and, as opportunity arises, new subjects are introduced, new classes are formed, and every branch is vigorously kept in operation. It has never been part of our plan to make Lectures a prominent feature of the Institution: the reason is well expressed by H. S. in page 9 of the Journal of the Society of Arts. Lectures cannot, at the same time, meet both the wants of tyros and of more advanced students. Still, it was thought advisable to have a connection with the scientific and literary gentlemen of the town, and for this purpose our monthly lectures are given, and have been willingly supplied.

Perhaps I could not better convey to you the means of working the People's College than by a plain statement of the fact. Every half-year the secretary takes down the names of the most advanced and worthy members of the College. He communicates with them, and invites them to meet the Committee at a certain time. The meeting is held, and the nature, constitution, objects, wants, &c., of the Institution are explained. The utmost cordiality prevails, and the Secretary takes the class-list and goes through the classes *seriatim;* monitors are appointed for each, who feel honoured by the appointment, and most cheerfully and efficiently perform the duties pertaining to the office. Then, to instruct these monitors, professional gentlemen are engaged for the French and German languages; and what are called the senior classes of the English department (not in point of age, but of higher attainments), are conducted by three of the most competent members of the College. Take, for instance, the Senior Composition-class: at the Half-yearly Meeting, the Secretary takes the names of about twenty students, who are appointed to read essays during the half-year. A list of these hangs in the room, with the name of the writer and date of reading. At the appointed time, the class-monitor announces "The Composition-class" in every room in the Institution. The students assemble from the other studies in which they have been engaged. The monitor of the class refers to the list, and says, "Mr. —— is the reader; is he present?" He answers by rising, and taking his place (standing) by the side of the monitor. The monitor briefly addresses the members of the class, to direct their criticism—to explain that the object of the class is not discussion, but *literary criticism*. Though they may question an opinion, or dispute a fact, or ask (through the monitor) for explanations, yet their chief attention must be to the *composition* as a literary production. He urges upon them the importance of taking notes, &c. The reader then announces his subject (the choice of which is left to himself), and reads an essay, which occupies from fifteen to thirty minutes. The monitor then asks the students individually for their opinions, and sometimes there are most instructive criticisms offered, and the monitor acts as a sort of moderator against all offensive remarks. At the conclusion he offers his own observations; and again referring to the list, says, "Mr. —— will read next week." Should any of those appointed fail to bring an essay, the monitor gives a dissertation on "Style," on "Literary Men," "The Struggles and Triumphs of Authors," &c.; or reads an essay of Dr. Johnson, Addison, &c. I have known the burly Dr. (whose essay was read *incog.*) most severely used. Sometimes, the class will define literary terms—thus: "What is Criticism?" "What is Taste?" "What is Style?" "Beauties and Defects of Style;" "What constitutes *good composition?*" The consideration of these and kindred subjects, it is evident, must have great influence in forming habits of correct thinking and in improving the taste, and, I believe, the general character of the members. The Elocution-class is conducted on similar principles; and in the junior (elementary) classes the rudiments are taught by the same monitors. I believe the success of the People's College is mainly owing to the vigour of its management; and the only fear of failure is an over-confidence in the Committee, or neglect of the excellent rules laid down at its foundation. But, popularly constituted as it is, it ought at all times to ensure an energetic, though scrupulously just, Committee, which must command success' It will naturally be asked, Cannot similar Institutions be founded elsewhere? They may be: but it will require some person or persons acquainted with the practical working of them to begin successfully. The difficulty will be in the *beginning;* but difficulty does not imply failure, or there would have been no People's College in Sheffield. Those who would commence other Institutions of the same kind must be prepared to encounter similar obstacles to those which the first Committee of the People's College encountered and overcame; and, above all, having arranged a good and effective mode of management, and having laid down a sound and well-considered code of laws, they must guard against prosperity as well as against failure, and must take care, if their Institution flourishes, that those regulations are not set aside or neglected as unnecessary. It is a common error to believe that a flourishing Institution may dispense with those laws which were considered essential at its foundation; but it is a fatal error, and one which invariably leads to the most disastrous consequences.

J. W.

### PHOTOGRAPHY.

SIR,—I have much pleasure in contributing to your Exhibition a book of Photographs, entitled, *Le Premier livre Imprimé par le Soleil*. The history of it is this. In the year 1839, when residing in Switzerland, I saw one of the first specimens of the Daguereotype, and the idea immediately struck me, how much better it would be if the picture could be produced on paper instead of on silver. I was thus induced to experiment on this subject. A short time afterwards, I found that Professor Gerber, of Bern, had been trying to accomplish this with nitrate of silver, but the difficulty was found to be in the fixing. Acting upon some ideas communicated by Professor Gerber, I at length succeeded in producing the specimens now exhibited. Professor Agassiz, who took great interest in my labours, gave me letters to Mr. Robert Brown and M. Arago, suggesting the important use it might be to botanists. On showing the book, however, to M. Arago, at Paris, at the commencement of the year 1840, he informed me that Mr. Fox Talbot had worked on the same subject, and had patented a process. This stopped my proceedings. I have to state, that my method of fixing is *totally different* from that now practised.

L. L. BOSCAWEN IBBETSON

## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

INSTITUTE OF BRITISH ARCHITECTS, DEC. 13.—Mr. G. R. Burnett read a paper entitled, "Observations made during an Excursion in the Province of Orense, in the kingdom of Galicia, Spain," in which, after describing the town of Vigo and the Cathedral of Orense, he stated that in laying out the new roads in Spain four classes had been adopted; the first including all roads between the capital and the seaports, or the frontiers of the kingdom; the second including all roads which communicated between two or more provinces; the third including all roads which communicated between two or more important towns in a province; and the fourth including what would be called in England parish roads. These were of the respective total widths of 36, 32, 28, and 24 Spanish feet. The gradients were generally not steeper than 1 in 18, but in some very difficult passes the gradients had been made as steep as 1 in 12. In the more recently executed parts no waters were allowed to pass over the roads, but in some of the more ancient there were paved granite channels, called "Badenas," to carry small streams. When streams were carried under the roads, they were invariably conducted in masonry culverts. It was only exceptionally, as in the abutments of the Pontonesy Puentes, or in the voussoirs of the arches, that ashlar in regular courses was used. In all other cases rubble masonry without mortar was employed; and so skilful were the Gallego masons in the execution of this work, that even their houses, of three or four stories, were built in the same manner, and subsequently either pointed or rendered with lime mortar. The bridges on the road from Vigo to Orense were elegant in their proportions, of a broad, simple, massive character, and executed with a remarkable degree of perfection. The earth-works were executed in a very primitive style. A tool called the "azadon," participating of the character of the hoe, the spade, and the pick, was used by the excavators to remove the earth into baskets called "cestos," each of which contained about three quarters of a cubic foot. When these baskets were filled, they were hoisted upon the heads of women, and by them carried to the place of deposit.

INSTITUTE OF ACTUARIES. — December 27. John Finlaison, Esq., President, in the chair. Eleven Associates were elected. Mr. Jellicoe, V.P., read a paper "On the objectionable character of certain Methods very generally practised for determining and dividing Surplus in Life Assurance Companies."

After some remarks on the construction of the tables used by Life Assurance Offices, and the unfitness of such as that called the "Northampton," to be employed in certain of their calculations, the author proceeded to point out the unsatisfactory and delusive character of the old method of estimating the liability of these Societies, which, as was well known, gave a fictitious, and, as was supposed, a greater than the true value to such liability. He showed that this was by no means the case under given conditions, and that the results were never to be depended upon under any circumstances. The only safe and proper mode was to determine the value of the actual income from premiums as nearly as possible, setting aside such part as was intended to provide for the risks, and also such other remaining part as at the outset had been thought necessary to meet extra contingencies. To omit this last, as was strongly advocated by some gentlemen, was in fact to leave out one of the most important elements in the estimate, and would render the rest all but valueless. The advocates of the contrary practice, who were so afraid of introducing this quantity lest it should be in any part appropriated, appeared to forget that there might be no margin at all, as well as a large one; and that, in their anxious desire to conceal the latter state of affairs, they were quite keeping out of sight the danger arising from the former. The attention of the meeting was then drawn to the subject of the Division of Surplus, and the three modes most commonly adopted for the purpose were described, viz.: the division in proportion to the amount at interest of the premiums paid, in the ratio indicated by the value of the assurance, and in that denoted by the difference of these two quantities. The results afforded by these methods were contrasted with those given by the correct one, and it appeared that all three erred in the same direction, but in slightly different degrees; that is to say, all gave an undue share of the surplus to the older, at the expense of the younger members. The author explained the reason of this similarity of operation; and concluded by showing, that, on assumption, the additions made to assurances up to the present time, were no more than 4,656,000*l.*; then, that the portion given to the older members at the expense of the younger ones was more than half a million, or considerably upwards of ten per cent. of the total sum added.

## PROCEEDINGS OF INSTITUTIONS.

**Cambridge.**—The Half-yearly Meeting of the Philo Union Literary Society was held on Wednesday evening. The treasurer produced his accounts, which had been duly audited, and congratulated the members that he had a considerable balance in hand for the purchase of new books. The librarian's report showed that thirty new volumes had been added to, and 1,800 volumes borrowed from, the library during the past six months. Mr. Cockerell, in an eloquent address, presented, on behalf of himself and other subscribers, six portraits of British worthies, handsomely framed, for the adornment of the reading-room. Three new members were proposed, and the following gentlemen elected officers for the ensuing half-year:—*President:* Mr. C. H. Cooper, F.S.A.—*Vice-Presidents:* Messrs. Fenner, Martin, Webb, and Knowles. — *Treasurer:* Mr. Rowe. — *Secretary:* Mr. Reynolds Rowe.—*Librarians:* Messrs. Collings, Goody, and Johns.

**Cheltenham.**—The first course of lectures at the Literary and Philosophical Institution closed on Tuesday, the 21st inst., with a Lecture on Architecture, by J. Clarke, Esq., when it was announced by the President that arrangements had been made for a second course, extending over the next three months. On the 9th inst. an address on the establishment of Elementary Schools of Art was delivered by Lord Ward to a crowded and enthusiastic audience at the Town Hall, and it is expected that these classes may ultimately be brought into union with the Literary and Philosophical Institution.

**Corfe Castle.**—On Thursday, the 9th inst., Mr. Chatterton delivered his Lecture on the "Harp," at the British School-room, to the members of the Mutual Improvement Society, who mustered in great force, and were especially charmed with the illustrational portion of the lecture. This Society was established early in 1851, and received sixty-one contributions during the first year. It has been fostered by the Right Hon. George Bankes, M.P., the President, assisted by the nobility, clergy, and gentry of the district. There are a reading-room and library; and occasionally lectures are given. The President has promised to give a lecture himself shortly.

**Darlington.**—On Tuesday evening Mr. E. W. Jackson, of Norton, delivered his concluding Lecture at the Mechanics' Institution, on the moral, social, and physical condition of the people of this country during the last half century. The interest which the two former lectures afforded was more than sustained on the present occasion, and many of the eloquent reflections upon the greatly improved condition of all classes, during the period referred to, were received with much apparent satisfaction.

**Greenwich.**—Mr. C. W. Connon did a bold thing in offering to lecture on Lord Bacon before a popular audience, and the Directors of the Society for the Diffusion of Useful Knowledge did a very wise thing in accepting the offer. Though his lordship is the patron saint of this and many other kindred institutions, the homage he receives is rather a blind worship, founded on hearsay, than an enlightened veneration based on knowledge. It is highly proper, then, that the admirers of Bacon should "declare," that is, set forth and expound unto the people, the philosopher whom they now "ignorantly worship." The course consisted of three lectures; one on the Life of Bacon, another on his Philosophy, and a third on his popular Writings, particularly the "Essays," which have come so home to men's "business and bosoms." Mr. Connon skilfully relieved the necessary dryness of his second Lecture by reading some of Bacon's Apothegms, which came on the audience with all the force of novelty. In the third the lecturer excited no little interest by his onslaught on the "Transcendentalists," of whom he selected Emerson as a type. He was prepared to uphold the honour of Bacon, Locke, Addison, and that class of good old English writers, who say plainly and forcibly what they mean, "against all comers whatsoever." The course, as a whole, was well received.

**Hastings.** — On Monday evening a lecture was given, at the Mechanics' Institution, by Mr. W. Ransom, jun., on Self-Education.

The lecturer began by urging the importance of mental culture, and by making some remarks on the proper selection of books by self-educating working men. Our cheap literature was then descanted on, discriminating observations being made on the various classes of works included in that category. Several subjects of study, religious, scientific, and philosophical, were next recommended, and the most useful books pointed out for study under those several heads. The place occupied by Mechanics' Institutions in the work of self-tuition was then indicated, and the relation adverted to which subsists between them and the Mercury of knowledge, the Press. In that part of the lecture referring to religious culture as "necessary both to lead us to truth, and to teach us to maintain it when discovered," remarks were made on modern theological literature; and, in conclusion, the lecturer said, that education was not simply to store the memory with facts, but rather to fill the heart with right feeling and to fortify the soul with right principle. The merely stored man was a walking automaton only—another man's warehouse. He who studied for mental discipline as well as to acquire information, was the real man—the living being into whose spirit the Almighty had breathed the breath of life. He exhorted them to strive to learn how to think as well as what to think; that their minds might have a self-determining power of their own, a power that took hold of all educational elements and all external influences, and shaped them to ends and conclusions worthy of an independent and intelligent will.

St. Ives.—On Wednesday evening last, the first of three Lectures on "Monmouth's Rebellion" was delivered by Mr. W. L. Evans, in the Public Institution. The subject of the present Lecture was "Monmouth's Boyhood, Manhood, Policy of the Royal Brothers," which gave great satisfaction to those present.

Newcastle.—On Monday and Wednesday evenings two lectures were delivered in the Lecture Room of the Literary and Philosophical Society, by C. T. Downing, Esq., M.D., "On the Empire of Japan." The lecturer commenced by stating, that the Japanese had most rigorously prohibited all foreign intercourse, but the time had come when it was deemed a matter of propriety to compel them to trade with other nations. As an instance of the severity of their laws relative to foreign intercourse, it was said that when Japanese mariners were wrecked and cast ashore on other lands, they were never permitted to go back to their native country. Formerly it was supposed they were a barbarous and unenlightened people; but it had been ascertained that they were considerably advanced in science, and that their proficiency in art was almost unrivalled, while their manners, customs, and institutions were by no means undeserving of respect. The lecturer then proceeded to describe the Japanese Islands, together with many other instructive and interesting particulars indicative of their industry, habits, and resources. On the second evening he dilated on the institutions of the country, its government, soldiers, merchants, policy, future prospects, &c. &c.

Sheerness.—The members of the Isle of Sheppey Mechanics' Institution were highly gratified on Tuesday, the 21st inst., by listening to a very interesting Lecture on Light, delivered by Mr. Barnaby, one of the members. After describing the various theories of light, in a very lucid and pleasing manner, the lecturer concluded by exhibiting the oxyhydrogen light; and stated that, on a future occasion, he would discuss in detail the different methods of artificial illuminations, and the various processes by which they were obtained.

## NOTICES TO CORRESPONDENTS.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings, are requested to forward them not later than Tuesday morning, or they will be too late for insertion in the following Friday's Journal.

*Subscribers to Journal.*—We cannot undertake to forward the Journal to unknown correspondents. In reply to a number of communications, we must state that it can be obtained through the usual trade channels.

*Members.*—Several Members of the Society have complained of not receiving the Journal. In every case, however, it has been found that they were duly delivered, and that the blame really rested with the Members' servants.

Members who can furnish original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal.

*Petitions.*—In answer to numerous inquiries as to the best time for presenting petitions to Parliament respecting the distribution of Parliamentary Reports, we have to state that any time during the next six weeks will do.

Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

## ANSWERS TO CORRESPONDENTS.

*Coating for Ships.*—"Your correspondent (No. 8) will find much useful information on this subject in four most elaborate papers by Mr. J. I. Wilkinson, who has treated the question historically, and dealt respectively with wood, lead, copper, and iron sheathing. It would appear that the art of sheathing vessels was early practised in China; a mixture of fish-oil and lime, which was very adhesive, and became so hard that the worm could not penetrate it, being used for that purpose. In the reign of Henry VIII. large vessels had a coating of loose animal hair, attached with pitch, over which a sheathing-board of about an inch in thickness was fastened. In 1670 a patent was granted to Sir Philip Howard and to Major Watson, for the use of milled lead sheathing, which, about the year 1700, was abandoned, on account of the rapid corrosion of the rudder-irons; and wood sheathing was again used. On the first introduction of copper, it was used in conjunction with iron bolts and other fastenings; these soon oxidated, and serious accidents occurred. The attention of Sir Humphrey Davy having been directed to the subject, he discovered that when two dissimilar metals were in contact, and immersed in sea-water, a voltaic effect was produced, which occasioned a rapid corrosion of the more oxidable metal, while the others remained uninjured. This he proposed to remedy by the addition of six protectors of cast-iron, two placed midships on the keel of the ship, two on the bows, and two on the stern. As far as the philosophical fact was concerned, the result was conclusive; but inconveniences of another character arose, for the whole surface of the copper became covered with barnacles and sea-weeds. Metallic sheathing, or a coating of metallic oxide, formed by driving broad-headed scupper-nails into the sheathing-board, is said to have been used by the Romans; but authentic records exist of the plan having been practised in this country in the year 1666. This mode of protection is also said to be well adapted to the timber piles of harbours, and other structures. More recently, Mr. Bethell has introduced a process of creosoting timber, by the injection into it of oil of gas-tar. The timber being placed in a vessel from which the air is exhausted, becomes thoroughly impregnated with the oil, which is insoluble in water, and so nauseous that no animal or insect can bear its smell. Creosoted timber has been extensively used for railway sleepers, and also for the piers of many engineering structures. Several other processes for preserving timber by the injection of soluble salts, such as corrosive sublimate, sulphate of copper, &c., have been patented by Burnett. Payne, and others; but it is believed, that as their efficacy depends upon coagulating the albumen and the sap of the wood, the activity of the poison is neutralised. At the Great Exhibition, Captain Peacock, R.N., exhibited some specimens of timber prepared with a new description of metallic paint, or composition, named "Anti-Sargassian," which has since been extensively applied to ships in the Royal Navy, and to those belonging to the West India, Peninsular and Oriental, and other large Steam-packet Companies. It has also been used for the sleepers of the Lima and Callao Railway, and the Copiapo Railway and Pier in South America. The salt-vessels plying on the coast of India use oil of tar, and a considerable quantity of castor-oil, mixed with cow-dung, which, while it adhered to the wood, was an effectual protection for the sides of the vessels. The "Jarrah" timber of Western Australia has been stated to be capable of resisting the ravages both of the *Teredo Navalis* and the *White Ant*; and colonial vessels built of that material have, it is said, traded among the islands of the Indian Archipelago for many years without being coppered."—A. S.

*Cement for Roads* (15).—"My impression of the matter is, that as roads are at present constructed and mended, none of the quick-setting cements (such as Portland or Roman cement) would effectually bind together the broken metal used in repairing Macadamized roads, and for this reason: immediately the stone is dressed on the road, and the scrapings thrown on, the way is opened to the public, and the materials combine and consolidate by dint of pounding and violent percussion. This would not answer with cement, since the process of induration would be interfered with and destroyed by any such sudden and 'shocking' contact with heavy bodies. Where time is not an object, a concrete may doubtless be made of Portland cement, small gravel, and granite chippings, which will prove very durable; but it must be laid on four to five inches thick, and will necessarily prove expensive. It is possible, that tar or bitumen of some sort might answer the purpose, though I should fear that the sudden and violent action of horses' hoofs and wheels would have the same injurious and disturbing effect on this material as on cement. Years ago, Mr. Telford used cement in the formation of the Highgate Archway road, but only as a foundation six inches below the surface. Top-dressing of granite was then laid on, and it has been one of the most enduring, because the best drained, roads anywhere about London. This example, coupled with other experience, convinces me that a good foundation is of the first importance, and that it is of far more consequence than mixing cementing material with the surface dressing, since consolidation takes place in the great thoroughfares quickly enough without it. There is much more to be said on the subject, but this will doubtless suffice for the question under consideration."—G. F. W.

"*W. R.*" is informed that there are no initial letters for Members of the Society of Arts. The letters, "F. S. A.," to which our Correspondent refers, signify, "Fellow of the Royal Society of Antiquaries."

## MISCELLANEA.

FLAX.—A new mode of preparing flax has lately been proposed by Mr. Watt, intended to do away with the process of "retting" altogether; and from a Report just published by the Royal Flax Improvement Society of Ireland, there seems good reason to believe that its introduction may hereafter lead to considerable improvements in this very important manufacture. In Mr. Watt's process, the ripe flax straw, as brought from the farm, is, in the first instance, passed through rollers to remove the seed; the straw is then placed in suitable close chambers of iron, having false bottoms of sheet-iron perforated with many holes. In these chambers it is exposed to the action of a current of steam for eight or ten hours; the condensed steam being, towards the end of the process, returned by means of a force-pump, and sprinkled again over the straw. After about twelve hours the operation is completed, and the wet and swollen flax straw, deprived of the whole of the soluble matters which it naturally contains, is removed from the steam-chests, and passed at once through rollers, which squeeze out any remaining water, and at the same time separate the epidermis of the straw. The flax is then dried, and in a few hours is ready for scutching. The whole time required therefore to convert flax straw into scutch flax, fit for the spinner, is about thirty-six hours; and the flax, which has thus been prepared under the superintendence of a Committee of the Flax Improvement Society of Belfast, in accordance with Mr. Watt's process, is declared by competent judges to be of excellent quality, varying in value from *60l.* to *70l.* per ton.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 24th Dec.*, 1852.

*Dated 8th Dec.*

992. J. Browne—Preventing escape of smoke from chimnies and consuming it.
996. J. Symonds and G. Mouchet—Cleaning metallic surfaces.
998. D. Beatson and T. Hill—Propelling ships.
1000. J. Lawrence—Projectiles.
1002. J. S. Wilson—Propelling.
1004. J. Hopkins—Obtaining line parallel to axis of the earth.

*Dated 9th Dec.*

1007. W. Mather—Plasters and machinery for same.
1008. W. Baddeley—Metal pipes.
1009. W. Allchin—Agricultural and other steam-engines.
1010. E. Hunt—Screw-propeller.
1011. E. T. Loseby—Timekeepers and cases.
1012. C. Greenaway—Anchors.
1013. G. Collier—Carpets and other fabrics.
1014. T. Masters—Cleaning knives and other steel articles.

*Dated 10th Dec.*

1015. J. Sheringham—Stove grates.
1016. J. C. Blackwell—Musical instruments.
1017. A. T. Jay—Safety letter-box.
1018. T. A. Smithson and G. H. Adam—Suspending carriage-bodies.
1019. J. Derrington and J. Chadwick—Cocks and valves.
1020. R. A. Brooman—Evaporating apparatus.
1021. J. Boilesve—Dessicating-apparatus (a communication).

*Dated 11th Dec.*

1022. T. Boardman—Looms for weaving.
1023. W. Rothera—Manufacturing nails, screw blanks, &c.
1024. G. D. Howell—Ventilation.
1025. J. Martin—Artificial fuel.
1026. E. Bates—Breaks.
1027. W. Sorrell—Furnaces and fire-places for consuming smoke.
1028. A. White—Apparatus for retarding and stopping railway trains.
1029. C. Bedells—Improvements in reels.
1030. S. Green.—Joining earthenware pipes.
1031. G. Dixon—Refining sugar.
1032. T. Morris and W. Johnson—Depositing alloys of metals.
1033. C. Ritchie—Measuring fluids.
1034. J. T. Way and J. M. Paine—Manufacture of glass.
1035. C. Griffin—Obtaining metallic copper from natural solution.

*Dated 13th Dec.*

1036. J. Glasson—Boilers.
1037. J. Hamblet and W. Dean—Bricks.
1039. G. Mackay—Stirrup.
1040. G. Mackay—Paddle-wheel.
1041. A. V. Newton—Regulating density of fluids.
1042. J. Lejeune—Machine for washing linen, &c.
1043. F. Dangerfield—Lithographic press.
1044. D. Napier—Steam-engines.
1045. H. Clayton—Bricks.
1046. W. H. Fox Talbot—Motive power.
1047. A. Ripley—Axles for railway wheels.

*Dated 14th Dec.*

1048. J. Bell—Railway chairs.
1049. C. E. Magnant—Tanning.
1050. J. N. Taylor—Ships windlasses and other winches.
1053. J. Baggs—Extracting gold and silver from ores.
1054. J. H. Johnson—Fire-grates and fire-places,
1055. W. Johnson—Manufacture of aërated waters (a communication).
1056. J. H. Johnson—Wind-guards (a communication).
1057. J. G. Jennings—Construction of drains.
1058. R. Appel—Anastatic printing.
1059. J. P. M. Floret—Producing simultaneously gaslight and lime plaster.

### APPLICATIONS WITH COMPLETE SPECIFICATION FILED.

*Dated 20th Dec.*

1108. J. N. Adorno—Manufacture of cigars.
1113. C. and T. Pilkington and A. Predijor—Joiner's brace.

*From Gazette, 28th Dec.*

NONE.

## WEEKLY LIST OF PATENTS SEALED.

*Dated 24th Dec.*, 1852.

97. John Macmillan Dunlop, of Manchester—Improvements in the manufacture of wheels for carriages.
174. Alexander Campbell Duncan, of Glasgow—Improvements in the art or process of dyeing cotton, or other textile fabrics, or cotton with other yarns, when printed or mordanted with the colouring matter of madder, or of dyewoods, and in machinery or apparatus employed therein.
285. Edwin Petit, of Kingsland, and James Forsyth, of Caldbeck, Cumberland—Improvements in spinning and drawing cotton and other fibrous substances, and machinery for that purpose.
365. Edward Lloyd, of Dee Valley, near Corwen, Merionethshire—Improvements in steam-engines, the whole or part of which improvements are applicable to other motive engines.
550. John Wormald, of Manchester—Improvements in machinery or apparatus for roving, spinning, and doubling cotton, wool, or other fibrous substances.

*Dated 29th Dec.* 1852.

329. Jonas Lavater, of No. 17, Grenelle St. Honoré, Paris—Improvements in the apparatus for measuring the inclination of plane surfaces and angles formed or to be formed thereon.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Dec. 29 | 3403 | Two-wheeled Vehicle. | David Hawkins | Stratford-on-Avon. |

# SOCIETY OF ARTS.

## FRIDAY, JANUARY 7th, 1853.

The Christmas recess affords a favourable opportunity for drawing attention to the principles upon which this Journal is conducted, and to the objects which it seeks to accomplish. As the organ of the Society, its columns are open to all whose contributions are deemed worthy of insertion; for an Association like this is especially dependent on the free interchange of thought on industrial subjects, and there are many men whose suggestions and ideas with reference to particular points are of great value, and who have no other means of giving them publicity. The ordinary meetings of the Society do not afford those facilities for temperate and useful discussion which are available in a Journal; and as each communication appears on the responsibility of its contributor, the general body is not committed thereby. A literary undertaking occupying a position of the kind has its independence preserved, and its utility secured, by thus throwing open its space to a voluntary supply of information. The community at large is greatly interested in the widest possible dissemination of knowledge on matters affecting their material progress; and the time appears to have arrived when all news of the kind is likely to be properly appreciated. Hitherto political intelligence has monopolized the attention of the public; but we seem brought, by the force of events, to the threshold of a new era—a hopeful one for the Society of Arts—when men will think and read more about what concerns them in their daily pursuits, and when economical and improved production will attract more notice. "The dignity of labour" begins to be realized; and surely, if specialties can support organs dedicated to their advocacy, a Journal devoted to the interests of the whole field of Industry ought to find "ample room and verge enough." There is nothing in the constitution of the Society which has started it to excite suspicion or misgivings as to its objects; for there can be nothing more free in the world than a voluntary Association, to which men may belong, or not, as they like,—and nothing less objectionable than the effort to promote the Industrial Arts—to draw attention to useful inventions—to remove or destroy influences injurious to production—and to carry out an organization by which labour misapplied may be saved, and knowledge of a practically useful kind widely circulated. The Society has completed its centenary,—and in that long space of time it has "done the State some service;" yet, among a hard-working, manufacturing, commercial people like ours, it is melancholy to think that the number of the Society's members is still so small, in proportion to the magnitude of the interests over which it watches.

With an essentially popular constitution, there is no reason why the Society of Arts should not be so powerful as to become an institution of the country. It strives to win that distinction by showing that it can be useful; nor is there any reason to despair that its efforts may yet be crowned with success. Great things are done now-a-days by the principle of association; and one of the most powerful instruments at its command is the Press. Without a journal, the Society has wanted a chief element of strength; for attendance and interest flag in all bodies brought together by voluntary means, where the stimulants of free discussion, oral or written, are either weakly supplied or altogether absent. The Society has nothing to conceal; what it desires to do, it well knows that it can only do by public support, and that to have that support its proceedings must be frank and open. No doubt there are many things in its own constitution that require alteration or amendment. It is not afraid of having such matters temperately discussed. The gain which the Society looks for in the establishment of a journal is not of a pecuniary character. It is entirely that useful information may be circulated in the easiest, quickest, and most economical way among members and the public; that voluntary effort, so apt to flag, may be kept awake and active by free discussion; that the machinery may be perfected for a propaganda of industrial knowledge and ready intercommunication on the practice of the arts throughout the United Kingdom, and its Colonies, and even in foreign countries; finally, it is that the Society's means of doing good may be, as much as possible, increased by the enlargement of its constituency. It has always been the boast of the Society of Arts that it lives upon the subscriptions of its own members, independently, receiving such aid from without as people may be disposed to offer, but asking no bounties from power, or no favours from patronage, that might compromise its position in the country. The confidence which it reposes in the public sympathy with its objects now demands a proportionate return. Unless the number of its members, and consequently the amount of its income, are greatly increased, the Society cannot occupy that enlarged sphere of usefulness now invitingly stretched out before it. It calls upon all members, therefore, to exert themselves,—

to remember that the Society is now exposed to an honourable rivalry with other bodies, some similar to, others differing from it in constitution, but all striving which shall be foremost in the promotion of the arts and sciences. If there is anything to amend or alter, let it be brought forward for discussion; but at least let the hands of the Council and the Executive be strengthened by a larger and a more vigorous constituency, and let the Society, having lived a hundred years from this date, "renew its youth."

## CIRCULAR TO INSTITUTIONS.

### C—Books—2.

Society of Arts, Adelphi,
January 1st, 1853.

Sir,—The Council of the Society of Arts, in continuation of a former Circular on this subject, dated the 26th of July last, have the pleasure of informing Institutions in Union, that Her Majesty's Commissioners for the Great Exhibition of 1851, have most liberally granted copies of the Jurors' Reports (No. 36), for distribution to such Institutions. The Department of Practical Art has also placed at the disposal of the Society, for the same purpose, copies of the Addresses of the Superintendents of the Department (No. 37). Dr. Lyon Playfair has likewise supplied copies of his Lecture on Industrial Education on the Continent (No. 38); Price's Patent Candle Company, a Report on the Schools attached to their establishment at Belmont, Vauxhall (No. 39); Mr. Mechi, his pamphlet on Agricultural Improvement (No. 40); Mr. Wilson, his Lecture on the Stearic Candle Manufacture (No. 41); the Society for Improving the Condition of the Labouring Classes, pamphlets on Model Dwelling-houses for Families (No. 42); and the Rev. W. W. Cazalet, his Lecture on the Musical Department of the Great Exhibition (No. 43). A limited number of copies of the Report of the Commissioner appointed to inquire into the state of the Mining Districts, and of a pamphlet by Mr. G. W. Yapp, on Art Education at Home and Abroad, have also been placed in the hands of the Council for distribution,—the former of which will be sent to those places where it is thought it will be received with peculiar interest, and the latter to those Institutions which having only recently joined the Union, were not in time to participate in the Art papers distributed on the last occasion.

The General Board of Health have delayed the issue of their Reports and Minutes (No. 32), in the hope of obtaining additional copies of some of their Reports, so as to be enabled to make up a larger number of complete sets. They are now about to be distributed, and the Board have kindly offered to transmit them free of expense.

In regard to the other publications, they will be forwarded during the ensuing week, through the same channels as the former parcel.

Edward Solly, Secretary.

## FINE ART SECTION OF THE PREMIUM LIST.

In connection with this List, published in the last Number of the Journal, the following remarks are made:

As respects the first division of the list, namely outline from poetic or historic subjects. Outline is an arbitrary mode of conveying ideas of form which has its foundation altogether in art, and was its first essay towards perfection; and although the progress of painting has been so great as to nearly approach complete imitation by the help of light, and shadow, and colour; yet outline, simple and unaided, still remains duly appreciated, as efficient to produce the greatest and most essential purposes of art, viz., the ideas of action and impression in the figures it represents. There is not, in fact, any such thing as an outline in nature; yet we recollect more of a form by its boundary, or separation from other parts, than by its parts projecting towards us; hence arises the satisfaction we receive from a line that truly marks that boundary; though no such line in reality exists. The imagination immediately loses sight of the fallacy, and dwells upon the form within it.

A true outline is a perfect thing; it has no exemplar in nature, but is received as an arbitrary token of a substance. The image it excites is, indeed, more or less perfect according to the information or force of imagination in the beholder. Fill it with colour and light and shade, and thus attempt to make it an imitation of a real object, and it becomes subject to comparisons which, in well-informed minds, may diminish its force. Its simplicity is the basis of its power.

The value of outline may be fully appreciated by those who have observed the great degree of character displayed in profile outlines, and still more by those who are familiar with the beautiful works in outline by Flaxman, Retsch, and others. In regarding many of these, the mind is so entirely filled with the action and expression of the figures, and the ideas they suggest, that it shrinks from the notion of an attempt at further completion.

It may be remarked, great and enduring as is the fame of Flaxman, that his reputation mainly rests on the exquisite and varied compositions that he has left us in outline. Noble as are some of his executed works, as, for instance, the group of Michael and Satan, it is through the medium of pure outline that his holy and tasteful mind addresses the thoughts of so many now throughout the civilized world. Outline appears to be an art that, pure and abstracted from the bustling commonplaces of the world, is especially fitted to convey and illustrate poetic thoughts and images. In all departments of art is it also most *practically* useful. It decides the subject, composition, and character of a painting, or a piece of sculpture, or work in architecture, or design for manufacture, and is worthy of the most serious attention of practitioners in all branches of imitative art. Chaste and true, and characteristic outline, can be derived from no other source than a pure knowledge of beautiful form; and it is a most agreeable quality in an artist to be able to plant an image on the mind by a light, skilful, yet firm line. It may be well noticed here, that if an outline be drawn too hard, thick or black, that the figure it intends to convey may be forgotten in the line, and if too weak, its force may not be adequate to produce the desired effect.

As regards the Second section of the Fine Art List, viz., Illustrative Drawings in aid of Science, they divide themselves perhaps into two sections, viz., those suited by their size and treatment for lectures, and those adapted for books. It would be desirable that candidates in this class should keep this in mind, so as to render their labours directly available, if desired. The Society hopes that this class of art, while aiding the highest objects, may be not only highly useful, but also eventually substantially remunerative to the artist. On every occasion and subject now art is called in to aid the pen with illustrations, and lectures and pictures, mutually assisting each other, are everywhere placed before the public for its pleasure and advantage. Equally interested in Science and Art, the Society has had its attention particularly turned to this subject, by the many lectures given in their own rooms, and by the circulating scheme of lecture instruction, forming part of the advantages to the general public contemplated by the Union, now so widely going on between the Society of Arts and other instructive and scientific societies throughout the country. That a further degree of scientific art illustration is wanted than that already available, may be illustrated by a late remark of a distinguished botanist, "That there were but two men in the country that he knew of that could draw a flower!—that is scientifically and botanically as well as artistically." It is desirable that, in all cases, the representation should be of the actual size, or on some definite and simple *scale* as regards the actual size of the object represented.

In regard to the third section of the List, "Art Designs for Manufactures," a few words may be added as to the direction that ornamental art is likely to take in this country. The question of Design in this branch is one that has not till very lately taken a substantial hold on this country. At the first impression of its importance, and from seeing the baldness in design of many of our manufactures, the taste of the public, as well as the artist, in many cases, rushed towards the opposite defect—over-elaboration; but that the English taste will eventually, perhaps, after a few oscillations, find its point of rest not far from *simplicity*, there is little doubt. A pure taste is even now gaining force among us. Art is but part of a whole. It is one manifestation of the spirit of the people, and that kind of art will alone take root and flourish that is in accordance with the national character. In the belief, therefore, that utility and simplicity will be the character of our art designs for manufacture, these few words are addressed to those who may be disposed to become candidates in this branch for the Premiums of the Society.

## ART EDUCATION AT HOME AND ABROAD.

UNDER the above title a small pamphlet has just appeared, from the pen of Mr. G. W. Yapp, which is dedicated to the Council of the Society of Arts. The object of the author has been to embody the most important facts and opinions which have been placed before the public, from time to time, in connection with the Art Education of the masses; at the same time having reference to the proposition recently submitted to Parliament in her Majesty's speech, viz., "the importance of considering a comprehensive scheme for the advancement of the Fine Arts and of Practical Science." The author shows that the large amount of attention which this subject is at present receiving is not the result of chance, but of a long chain of circumstances and wants to which public attention has been directed.

These wants have now become greatly aggravated, owing to the attention which has been directed to them since the close of the Great Exhibition, where the masses were taught to appreciate art, and saw their own deficiencies, as compared with the productions of their foreign competitors. Having referred to the foreign schools of art, and the importance which Continental governments attach to them, he endeavours to show that the same narrow-minded views which impeded the first establishment of Mechanics' Institutions in this country, is again operating against the introduction of a national system of Art Education, and with equally little foundation.

The want of sound judgment in the establishment of drawing-schools, or in the choice of those who have been employed as teachers, in connection with Mechanics' Institutions, have in the majority of instances led to unfavourable results; and the want, still felt among the industrial classes, was endeavoured to be met by the establishment, in 1837, of the schools of design, as it is at present by the Department of Practical Art.

The author next proceeds to consider the present condition of the British Museum—its rapid growth, the numerous and varied collections which it contains, and the impossibility of adapting the building to the requirements of the public. This has led Mr. Hallam, one of the Trustees, to advocate the erection of an entirely new building; and this, again, has been followed by other propositions, for the re-distribution of the seven distinct collections; viz., books, manuscripts, antiquities, prints, mineralogical, botanical, and zoological specimens, within its walls.

The fact of historical portraits being arranged in the Zoological Gallery at the British Museum, one among many of the accidental mixture of subjects, has led to a proposition that the collection of stuffed animals should be located in the vicinity of the Zoological Gardens; while, with respect to the splendid collections of sculpture, coins, medals, and the drawings and prints by old masters (now shut up in drawers, and lost to the public), could not be more appropriately placed than in the National Gallery. They might be exhibited, as is the case in the Taylor Gallery, at Oxford, in the Louvre, at Paris, and many other places, in long series (framed), illustrative of the peculiarities and growth of the different schools. The foregoing considerations lead naturally to the following propositions. That our collections of national pictures should be brought under one roof; and that in addition to providing space for pictures and prints, an architectural museum might be formed, in which collections of Saxon, Norman, Gothic, Tudor, and Elizabethan specimens might be made with comparative ease. The nation already possesses upwards of 6,000 or 7,000 examples of ornaments, collected by the late A. W. Pugin, which were selected for the use of the carvers employed at the new Houses of Parliament. This would tend much to counteract the want of style so apparent in our national buildings. It is not proposed to limit our collection of national treasures to one building only; but, if collected or brought to a focus, great facilities would be afforded for re-distributing casts and copies of the best examples.

In conclusion, our author remarks:

> "It is a creed with some that England, as a nation wants taste, that she is deficient in appreciation of form and colour. It may be true. She was once illiterate; she is not so now. Education has not yet become that universal endowment which the best interests of the country demand; but no one ever doubts that all could learn to spell, to read, and to write, if instruction were offered them. Why, then, should we doubt the existence of other talents until we have made an earnest attempt at their cultivation?
>
> "When the College of Industry, of Art and of Science, shall have been thrown fairly open to the rising generation, and when the people of England shall have had opportunities of cultivating knowledge and beauty in museums, where space shall prevent confusion and arrangement invite inquiry, it will be found that our oft asserted artistic incapacity was a fiction, and that our powers, like the wheat in the hand of the mummy, only waited for air and light to spring into life, and bear fruit abundantly."

## PHOTOGRAPHIC SOCIETY.

A Committee was formed early in the spring of last year, with a view to the establishment of a Photographic Society, but the existence of the Patent rights prevented the object from being carried out at that time. The discussions, however, which took place on the subject between Mr. Fox Talbot and the Committee, and the appeal made to that gentleman by the Presidents of the Royal Society and the Royal Academy, induced him to abandon them, and, with a slight exception, to leave the Act unfettered. This obstacle being removed, the Committee have resumed their labours; and it is understood that nearly 200 hundred persons have given in their names as desirous to join the Society, and that a meeting will shortly be called to launch it, and elect its officers. It is intended to hold meetings once a fortnight during the first year of its formation, when communications will be read, specimens exhibited, and discussion ensue on subjects and novelties connected with the art. Probably, a laboratory will, in time, be established, where experiments may be carried on and processes tested. A gallery, too, of photographic pictures will doubtless form part of its proceedings, and remain open during the usual seasons, when the progress of the art will be shown from year to year. The subscription, it is said, is to be one guinea annually, with an entrance fee of one guinea. The bringing together individuals who have hitherto been working at the art, in ignorance of what each was doing, cannot fail to assist in its development. Indeed, this was strikingly exemplified by the Great Exhibition, to which may be mainly attributed the impulse that has been given to Photography. The walls of the Society of Arts bear striking testimony to this fact; and it may be confidently expected that the Photographic Society will aid materially that development of the art so auspiciously commenced by the Great Exhibition.

## THE PROGRESS OF STEAM NAVIGATION.

*(From a Correspondent.)*

The progress of steam navigation during the past twelve months has been so marked and satisfactory, that it is proposed to pass in review some few of the more important changes and modifications that have been made during that period.

The use of iron in the construction of the hulls of our merchant marine has been greatly on the increase; and at no period since its first application to this purpose has it found more favour. Both on the Thames, on the Clyde, and at Newcastle, iron ship-building is now being carried on by the eminent firms of Messrs. Mare, Scott Russell, Laird, Tod and Macgregor, &c., &c. Though not adapted to war-steamers, owing to the shot on passing out carrying away an entire plate, and so making holes which it would not be possible to stanch, it seems admirably calculated for the merchant service. For some time there has been a strong controversy as to whether wood or iron was the safest material to employ. The advocates for the use of iron contended that by building a ship in different compartments, with water-tight bulkheads, one compartment might be filled with water, and yet the vessel float with perfect safety. On the other side it was asserted, that supposing a vessel to strike upon a rock, the danger with an iron ship would be greater than with one built of timber, as any damage could not be so easily repaired. It is singular that during the last year a large steamer of each kind has been completely wrecked and lost, under somewhat similar circumstances. Her Majesty's ship, *Birkenhead*, an iron vessel, it will be remembered, struck upon a rock a-midships, so that the fires were put out, and all control over her was immediately lost. The waves dashing over, caused her to break at this point, and then the two pieces went down. The other case was that of the *Memnon*, a timber ship belonging to the East India Company, which was lost in a typhoon in the Red Sea. It is believed that the present system of measurement for tonnage acts prejudicially in obliging ship-builders to make bluff bows and sterns, to the absolute loss of speed. It is said to be owing to this cause that the French war-steamers, the *Canopus*, for instance, attain a higher speed than our own frigates.

In the engineering world attention has been principally given to direct-acting engines, of which there have been several very successful adaptations, both to screw and paddle-wheel steamers. In these engines the ponderous beams and frame-work, which in some instances, as in the large vessels belonging to the West India Mail Packet Company, amounted to thirty cwt.

per horse power, and even more, with the old flue-boilers, are dispensed with. The vertical flue-boilers, which very nearly approach tubular-boilers, patented by Mr. Mills, the engineer of that Company, and by Mr. Lamb, of the Peninsular and Oriental Company, in conjunction with the double-cylinder direct-acting engines, the best adapted for engines of 800 horse-power, have tended materially to reduce the weight, which by these means has been brought as low as eighteen cwt. per horse-power, and with tubular-boilers to fifteen cwt. per horse-power, a saving of 100 per cent. over the old system. Several rotatory engines have been patented, and some of them have been tried; but as yet their capabilities have not been sufficiently tested to enable an opinion to be formed as to their economy and general applicability. Mr. Penn is now constructing for the *Himalaya*, a new screw steamer, belonging to the Peninsular and Oriental Company, engines of 500 horse-power, on the direct-acting vibrating principle, first patented, it is believed, by Mr. Joseph Maudslay. It will therefore soon be seen whether this principle can be safely and economically adapted to engines of this power.

Amongst the screw steam-ship companies, the General Screw Schooner Steam Navigation Company must be placed first, not only for the safe and sure policy they have adopted, but also for having commenced, through Mr. Laming and his friends, the use of direct acting engines, so well adapted to the circumstances of the case. The Australian Company have hardly yet had a fair trial, for their mail contract commenced before they could possibly get steamers built, and hence the necessity for purchasing old Government steamers. Recently, too, the Government have been building screw-steamers exclusively for line-of-battle ships, and have ordered four pairs of engines from Messrs. Maudslay, Sons, and Field, and four from Messrs. Penn, each pair of 400 horse-power, and on the horizontal cylinder direct-acting principle. The boilers and engines in these steamers are to be placed from seven feet to eight feet below the load water-line. The Peninsular and Oriental Company are also beginning to acknowledge the value and advantage of the screw, and many of their new vessels are on that plan; amongst others, the *Himalaya*, of upwards of 3,000 tons burthen. It is to be hoped that some of the old Companies will consider well the advisability of using the screw propeller, especially for long voyages; and also that they will take into consideration the propriety of putting their engines into faster vessels. During the year, proposals have been made for the construction of very large steamers, of 15,000 tons burthen, to be propelled by the screw and the paddle-wheel conjointly. The paddle-wheels are intended to be worked by a pair of direct-acting engines, into which high-pressure steam is to be introduced; the steam being cut off at one-fourth or one-fifth of the stroke, and then led away to another pair of direct-acting condensing engines, working the screw-shaft at a great velocity. Mr. Brunel is the promoter of the plan for the large boats. Several very important improvements have been introduced in the screw propeller—that of feathering, for instance—for diminishing the loss of speed while sailing, and several very easy methods of lifting it on deck for examination and repair, when on a voyage. There can be no doubt, that though not applicable to shallow rivers, the screw propeller is the most desirable means of propulsion for long voyages and deep sea navigation.

The application of auxiliary steam power, first proposed by Mr. Samuel Seaward in 1829, still continues to attract attention; and if it is an improvement for colliers on a short voyage of four days from Newcastle to London to be so supplied, how much more so would it be for an East Indiaman on a four months' passage, and where probably a small assistance would enable her to overcome light and adverse winds. Supposing only a month could be saved in a voyage to India, each ship would thus be enabled to make an additional journey a year; and as the yearly expenses for the crew, &c., would continue about the same, there would result a saving to the public and a direct gain to the owners. In *The Witch of the Wave*, *The Challenger*, *The Challenge*, *The White Squall*, and several others, this plan has been adopted, and the result has been that the voyage to China has been peformed in ninety-four days.

Scientific men are now endeavouring to devise a means of obtaining power other than by the combustion of coal and the evaporation of water. When it is considered how large a proportion of the tonnage of a vessel is occupied by the fuel, and the great expense that the Companies are put to by having to export coal from this country, it will be recognised as a most important desideratum. The caloric engine of Ericsson, of which so much has been said lately, but of whose performances so little seems to be authoritatively known, still requires coal; and so, supposing it to equal all the glowing reports which have reached this country, it yet does not entirely effect the object desired.

## TRADE MUSEUMS.

The following Circular has been addressed by Her Majesty's Commissioners for the Exhibition of 1851, to most of the Exhibitors in the First Four Classes; and as it bears in some degree upon the intentions of the Commissioners which were reported on by the Council on the 22nd of December last, it may be considered interesting to the members of the Society:

Office for the Exhibition of 1851,
Marlborough House, Pall Mall, London.

Sir,—I am directed to inform you that at the close of the late Exhibition many of the Foreign Exhibitors consented to leave with Her Majesty's Commissioners Specimens of the Produce exhibited by them, which, together with similar Specimens from the Exhibitors of this Country, form the nucleus of a collection which Her Majesty's Commissioners trust soon to find means to render useful to the public and to the Exhibitors themselves, and which is now by permission of Her Majesty deposited in Kensington Palace.

Many of the Foreign Commissioners at the same time expressed a wish to be allowed to have in return some Specimens of the Produce of England, shown in the Exhibition, to be deposited in some place where they could be readily consulted by the public of their respective countries.

Her Majesty's Commissioners being desirous of complying with their wishes, have directed Collections of Specimens to be prepared, which, with few exceptions, will be confined to Raw Produce.

It is found desirable to obtain, among other things, Specimens of            , and Her Majesty's Commissioners would be glad to know whether you are disposed to furnish for this purpose
of the same description as that exhibited by you.

They would be glad to receive an early reply, and I will be happy to give you any further information on the subject. Should you wish to see the progress already made, Mr. Read will be in attendance for that purpose at Kensington Palace, between the hours of Ten and Twelve o'clock. I have the honour to be,

Your most obedient Servant,
(Signed) HENRY C. OWEN,
Captain, R.E.

## HOME CORRESPONDENCE.

### THE PHOTOGRAPHIC EXHIBITION.

SIR,—The Photographic Exhibition in the rooms of the Society of Arts is eminently suggestive, and, as the first of the kind in this country, claims especial attention. In this gathering together of *sun-pictures,* there are examples of almost every degree of excellence, and of a large number of defects; it therefore becomes a most useful study to all who are interested in the progress of employing one of the most subtle of the physical agencies in the art of multiplying the beautiful and preserving memorials of scenes and persons, rendered valuable by their perfections or their associations. Of the excellencies, and many of the defects, notices have already been given in the Journal of the Society; to these, therefore, it is unnecessary to refer in detail. It is, however, apparent that many of our best Photographers, although exhibiting evidences of superior manipulation, do not sufficiently appreciate the importance of attending to the science, by which alone they can be guided to excellence in the art they so zealously cultivate. In the very best pictures in the Exhibition there will be found some points which are departures from nature; there has not yet been produced a Photographic picture which would satisfy the educated eye of a Claude, a Turner, or any of our eminent living landscape painters, who have studied nature under every aspect of light and shadow. Colour may do much to deceive us into a belief that we look through air as through a veil, at the gradually fading outline and tints, constituting distance; but colour is not absolutely necessary to produce this upon a plane surface; it may be effected by the judicious disposition of black and white. It is difficult to say if we may hope to solve the Photographic problem, by which we may produce pictures agreeing in illumination with that of the objects copied,—whether we may succeed in producing that *kind,* as distinguished from *degree,* of sensibility, which may be relatively disturbed or chemically changed by radiations of very unequal intensities, and influenced at the same time by many disturbing forces.

To select a group of Photographs as examples, the very excellent pictures by Mr. B. B. Turner may be chosen. Beautiful as these are in many respects, it will be found that the lights upon the trunks of the trees, and those spread over the various surfaces of *green* sward, *brown* paths, and *blue* water, are not such as we see in nature. The "*Photographic truth*" is not nature's truth,—the watery mirror brightly reflecting solar light never gave to the eye such an image of the church as that which we perceive in this picture. The productions of Mr. Buckle and Mr. Roslyn are of another style, and may be selected as the nearest approaches which have been made to obtain that delicate gradation of lights and development of the parts in shade. Still, I am satisfied these gentlemen would themselves admit that their Photographs are far from realizing those beautiful effects which they have studied so earnestly to reach—as is evident by their works. The same may be said of the productions of Messrs. Ross and Thomson, of Mr. Owen, Mr. Fenton, Sir William Newton, Mr. Stewart, and others. The catalogue informs us that the processes employed have been "*paper,*" meaning, in all cases, the Calotype of Mr. Henry Fox Talbot; *albumenized glass* and *paper;* "*Waxed paper,*" usually the process of Le Gray; and "*Collodion*" in its various modifications. Now, the point to which I desire to direct attention is, that each of these processes has its own scale of action; and that effects which can be produced by one, cannot be obtained by the other, under the same conditions of radiation. To give an example: a well-defined prismatic spectrum is passed through a piece of glass, stained yellow with the oxide of silver. In such a spectrum the *colours* of the rays are very slightly affected; but if we throw this spectrum upon a piece of positive paper, prepared with chloride of silver, a very long time, even in the brightest sunshine, is necessary to produce any change; and even after this prolonged action, all the space covered by the luminous rays remain *unchanged,* a little blackening taking place over that section beyond the violet ray, where no light is detected. If we substitute the far more sensitive calotype paper, the result is nearly the same, but the action takes place much quicker; and with the waxed paper the darkened space is only brought down into the violet ray, as it would appear, by the alteration of the refrangibility of the chemically active ray by the waxed surface through which it has to pass. The effect on albumenized glass or paper is not remarkably different from this. A collodion plate is placed to receive the spectrum, and if it is exposed for one minute to its action, and then the effect developed in the usual way, it will be found that, through the whole length of the *green, blue, violet,* and the extra-spectral rays, an intense impression has been made. If additions of spirits of wine are made to the collodion, this chemical change is still prolonged in a most remarkable manner; and I have obtained conditions, under which every luminous ray but the *red* (which, by the way, will sometimes act powerfully on varieties of the calotype) acts with energy, and the rays beyond the violet with singular force. The addition of alcohol destroys, to a great extent, the adhesion of the film of collodion: but, by overcoming this, I believe we have indications of a surface which may be equally acted on by each chromatic radiation respectively. Many of the beauties in the collodion photographs by Mr. Goodeve, Mr. Horne, and Mr. Delamotte, are, I believe, due to this property.

By the employment of organic compounds with the argentine preparations, I am satisfied we may equalize, to a far greater extent than has hitherto been done, the chemical inequalities of the luminous radiations. An extensive series of researches in the direction indicated are required (a few of these are engaging my attention), and every discovery in this line of research, will tend to the improvement of the art, viewed with reference to its artistic capabilities. Neatness of manipulation will do much; but we see, by the examples before us, that this merely is not sufficient to enable us to picture Nature in all her varying aspects of light and shadow, of repose and life. Researches of the kind indicated are required; and since they are easily carried out, and must furnish important results, let us hope they may engage the attention of some of the zealous photographers who have added to the interest of this, the first Exhibition of Photography in England. ROBERT HUNT.

SIR,—In your last week's review of the Photographic Exhibition, you say, with respect to the series of pictures exhibited by the Royal Commissioners, that they are, with the exception of Mr. Owen's contributions, scarcely so meritorious as many others in the collection.

This is very true; but if you had made the phrase a great deal stronger, it would have been a great deal truer. It was to be delivered of these abortions that French photographers were invited over to this country at the very time that Professor Goodeve was threatened with expulsion from the Crystal Palace, while engaged in the production of the pictures, some of them copies of the same statues sent by him to the Society of Arts' Exhibition.

Let foreign artists, if they possess superior skill, be welcome to employ and receive the reward of it here; but such claimed superiority surely should be clearly ascertained before it is officially recognised. Had this rule been observed by the Royal Commissioners, we should have had a better record of the Great Exhibition.

P. Q.

SIR,—Surely Captain Ibbetson must be in error when he speaks of his having been stopped in his proceedings with reference to his photogenic drawings by Mr. Fox Talbot's patent, in 1840. That gentleman did not take out any patent till 1841. F.

## GREAT EXHIBITION SURPLUS.

SIR,—As a member of the Society, I have perused with interest, not unmixed with astonishment, the recent Report of the Royal Commission. It has fallen coldly upon the public, been protested against by the learned bodies of the metropolis, and is disposed of with more candour than praise by our Council. When every one was on the tip-toe of expectation to know what would be done with the surplus of the Great Exhibition, down upon their anxious upturned faces, like a shower-bath, comes the announcement that sixty-eight and a half acres of land have been purchased at Kensington Gore, for a sum which more than entirely absorbs it. They look for explanations, and they are favoured with the misty outline of an impossible scheme, which it seems utterly unaccountable how such men as compose the Royal Commission could ever have given their sanction to. Even assuming that an investment in land was necessary, the selection of a site cannot be regarded as a happy one. The masses were once attracted to Kensington; but did they go there conveniently to themselves, or with the favour of the inhabitants? was it looked upon as a vulgar invasion, or not? and will they go again? Will students who find it hard enough work to struggle to Somerset House and Marlborough House from the cheap suburbs, be able to reach Gore House day after day? Does the organization of this vast metropolis, which is constantly changing, justify so enormous an expenditure as is contemplated for a site which, twenty years hence, may be the least accessible part of town? It appears to me that the Royal Commission have deliberately sacrificed the surplus of which they were the trustees to the conveniences of Government. Government wanted space for the new National Gallery, and for portions of the British Museum, and they rush with the shillings of the million to help it, without inquiry whether such an alliance is necessary or desirable. They commit the proceeds of a great voluntary effort to a dubious partnership with state establishments, which have never been satisfactorily managed. What can the people think of an act which associates their contributions with ideas of Trafalgar-square architecture, picture-cleaning carried out with the scrubbing-brush, railings that cost 14,000*l*., the jobbery, and the bickerings,—extended to the surplusage of the Old Curiosity Shop in Bloomsbury? Then, as if all this was not sufficient, the most triumphant success of modern times is to be associated with the Government School of Design, hitherto an admitted failure, and the Government School of Mines, which has already had a home provided for it in Jermyn-street, far more comfortable and splendid than, by its usefulness, it has yet been able to justify. Even if these schools had given much clearer evidences of a suitable return for the vast outlay upon them, surely the Royal Commission need not have interfered with the State as long as it felt disposed to act as their wet nurse. I feel satisfied that the application of the Great Exhibition surplus to any scheme dependent on Government co-operation is a monstrous mistake. It chills all the enthusiasm of popular sympathy; it substitutes the idea of taxation for that of voluntary contribution; it puts the industrial arts under the shadow of a State machinery; it refers to parliamentary votes what every man who lives by labour would like to honour with his independent support.

But let us assume that this union is a right one—that the Commission and the Government between them may properly spend 400,000*l*., or more, upon a site of 150 acres, without having commenced to lay one brick upon another; what remains to be done afterwards, and how is it proposed to proceed? Buildings are to be erected museums to be formed, a great university to be endowed, and the learned societies of the metropolis to be brought into "juxtaposition." The most magnificent schemes must submit to the vulgar test of practicability; for that, after all, is what distinguishes greatness from charlatanry. Mahomet went to the mountain when it would not come to him, but the Royal Commission have no such alternative. Suppose the learned societies object to be exhibited as a happy family,—the Geographicals refusing to lie down with the Geologicals, and the Asiatics, the Chemicals, the Engineers, the Antiquaries, the Agriculturals, each preferring their own fig-tree, as they at present possess it. The Royal Commission have included these bodies in their plans without even the formality of consulting them. They make the supply of a want which they have not ascertained the existence of a plea for a land investment at Kensington. Again, take the money question,—where, in the name of all that is fortunate, are the funds to come from with which to construct immense buildings, collect great museums, and salary a pompous array of professors? It is not, surely, expected that all this will be done by voluntary contributions. Then you fall back upon the public purse — Government interference — mismanagement, failure! Alas! for the Royal Commission! They have sunk the money with which they were entrusted in a land speculation, and they will never get it back again. Something might be hoped for if they turned market-gardeners, or if they came to terms with some "disinterested Mr. Kelk," who would cover their estate with houses. But the cheese-paring economists of Parliament will never vote supplies to relieve them from the position in which they have so hastily involved themselves. Even the first appeal to the House of Commons on this subject excited murmurs which could not be mistaken; and the Chancellor of the Exchequer had to give assurances which will not be forgotten hereafter.

Yet I am willing to argue this question as if all that has been done is right, and as if all that is contemplated were feasible. What then? Is this vague scheme that has been put forward without details, and defended by an appeal to the most doubtful continental experiences, so desirable after all? Is it the best way of going to work for the promotion of the Arts, and of industrial education? Will it most help on the objects to which the Great Exhibition was dedicated, and thus satisfy the public as to the discretion with which the Commission has discharged its trust? I think not, and will state shortly why I think so. It appears to me, that the question of industrial education has been entirely misapprehended; that you cannot successfully teach the arts of life in schools, or safely hand over the principles upon which they rest to professors. The tendency of all collegiate systems is to dogmatize, and dogmatisms are fatal to progress. The first men in every branch of industry, and the best and surest instructors in it will give their lessons to apprentices in the workshop, not to pupils in the class-room. It must always be so. They will labour where the rewards of their exertions and talents are greatest; so that to inferior hands, or to pretenders, the chairs of the proposed University will be surrendered. Our schools and colleges may with advantage have the present course of instruction given in them widened. Science, in its various branches, may share more equally with literature the attention of our youth; but any attempt to introduce into this country the technical education of the Continent, must prove an egregious failure. There is not only no adequate proof that the want of such a system is felt, but the whole weight of evidence is in the other direction. Even the facts collected by Dr. Lyon Playfair abroad tell more against than for the views of the Royal Commission; and I do not hesitate to say, that an inquiry of the kind, less partially conducted, would have dealt a decisive blow against the whole scheme. In this country our experience runs entirely in the opposite direction. We have never tried anything of the sort without its being followed by a disastrous break-down. We have taken and still hold the highest place as an industrial community, without any such aids. Our great manufacturers and engineers, for the most part, look down with disdain upon the feeble efforts made to help them by a body which, if they really wanted the thing done, they would begin by dispensing with. They know very well that if technical education was desired, they themselves must supply it; nor will they readily consent to spoil the training of the workshop by making it a school, or that of the school by turning it into a workshop. Except in very rare instances, the two things are incompatible, for when labour commences, scholastic instruction terminates; and in learning to earn his bread by his own industry, the boy becomes a man. He will give or take information upon equal terms, but he can no longer be taught. I believe in the desirableness of a more liberal, and less purely classical, or mathematical course of education in schools and colleges. I believe in a more open and expansive system of study at our Universities; I think the existing machinery may be made more useful, and more appropriate to the wants of the age: but a new University, new professorships, new degrees, and a new curriculum, can no more be made respectable in the eyes of Englishmen, than a new empire or a new aristocracy. The whole thing would have a Brummagem character at once, and even the west end site, the enormous expenditure, and the influence of museums and galleries of art, would not save its reputation. If more science is wanted in this country, the want will create its supply in the natural way, without any state forcing; if scientific men do not meet with adequate encouragement and support, it is because they have not condescended to give to practice the full benefit of their abstract labours.

Among a free community like ours everything that is worth knowing soon finds its way into print; and a large, intelligent, and increasing body of readers offers to intellectual effort the strongest incentives on the one hand, while the pressure of necessities, as they arise, stimulate on the other. Our system of voluntary associations, for the promotion of all public objects, guarantees us against the neglect of any flagrant evils in our social state; and it is far better that we should try to improve and strengthen the means we have got for accelerating the progress of the Arts, than to embark all our resources in new and doubtful ventures.

As a member of the Society of Arts, I feel indignant at the treatment which it has received from the hands of the Royal Commission. The scheme of the Great Exhibition originated in our Council—its success was largely due to members of that body. The early responsibilities of the undertaking were allowed by the Commission to rest heavily upon us, and if a strong claim existed on the appropriation of the surplus, it was ours; yet we are coolly placed on a level with all the rest of the world, and a formal application which we made was not even formally replied to. I am not surprised, therefore, at the guarded tone of independence with which the Report of the Commission has been treated by the Council. The freedom of a correspondent writing on his individual responsibility exempts me from their reserve; and it is well that the conflict of opinions on such matters should find vent in the Society's Journal. I do not question the sincerity with which the Royal Commission have sought to discharge their duties; but I think their scheme, so far as it has been developed, a hazy chimæra; and I mourn over the £150,000,—the shilling surplus of the masses,—sunk in a Cabbage-garden at Kensington-gore.

Δ.

## LECTURERS.

31st December, 1852.

SIR,—Permit me to avail myself of the opportunity afforded by this Journal to remark on the reception sometimes experienced by gentlemen engaged as lecturers on visiting some provincial institutions to fulfil their enagements; who, from want of due consideration, as I humbly conceive, are scarcely welcomed or at all noticed by the managers or officials.

For example, one gentleman of great eminence for scientific attainments and qualifications, some time ago gave a lecture in a provincial city, and, from the time he arrived until his departure, never saw one of the officers or managers, or at least not one came forward to greet him, and his fee was sent to him by a porter or messenger.

No doubt it must be conceded that these gentlemen, manifesting their superiority, as implied by their coming to teach, are entitled to be received in a courteous and hospitable manner, and made to feel a pleasure in their visit and in the performance of their duties, as imparting knowledge, with mental and intellectual gratification, to a pleasing and an agreeable party assembled and predisposed to be instructed and gratified.

The institution with which I have been connected for fifteen years has always acted in a very different spirit.

SURRIENSIS.

## LECTURES.

SIR,—My experience in connection with the Literary and Scientific Institution of this city induces me so entirely to accord with the proposition which has emanated from the Society of Arts, in reference to the union of Provincial Institutions, that I may perhaps be excused for troubling you briefly with the results of that experience.

The great difficulty with which the managers of an Institution like our own have to contend, is the provision of competent lecturers,—gentlemen properly qualified to give a popular exposition of the subjects treated of, without importing into their lectures topics of a political or sectarian character.

I think there can be little question that the Society of Arts could organize and liberally endow a corporation of gentlemen who should devote their time and talents exclusively to provincial lecturing,—stated intervals and regular circuits being appointed by a Central Committee of Management; while the requisite funds might be provided by an annual subscription from each Institution throughout the country, the amount to be regulated by the number of its members.

I believe that for twelve or fourteen such lectures, to be delivered at regular intervals, during the months of September, October, November, December, January February, March, and April, the Institution with which I am connected would cheerfully subscribe a certain sum per annum, in the ratio of the number of its members; and as there are several other Institutions within twenty miles of this city, which would no doubt be equally glad to secure for a fixed annual payment the services of a body of lecturers, upon whose ability and discretion they could rely, one heavy item in the incidental costs, that of travelling expenses, would be materially diminished.

What Provincial Institutions want is, (1) Lecturers, who, being thoroughly masters of their subject, should be able to embody, in a clear, succinct, simple and intelligible form, the most important results—the salient facts and prominent truths—of those studies to which their attention has been specially directed, and who, entertaining an earnest conviction of the elevated and elevating character of the art, science, or particular branch of literature to which they have devoted themselves, would imbue their hearers' minds with a corresponding conviction: and (2) Lectures, which should include within their scope, not merely the graces, but the utilities of our daily life,—teaching the merchant the soundest principles of commerce,—the manufacturer, the most valuable application of mechanics to the processes of his business,—those engaged in the production of textile fabrics, correct principles of taste in regard to the combination of colour,—potters, iron-founders, and all classes employed in "bringing rude matter into due form," the laws which should regulate design, and the agriculturist those facilities with which chemistry is daily presenting us for increasing the productiveness of the soil.

I think we cannot fail to observe, and I hope the Government will not be slow to discern also, that in the lecture-room of every Literary and Scientific Institution and Mechanics' Institute we are now planting *a pulpit for lay preachers*, whose functions, while they do not clash with, are second only in importance to those of the ministers of religion; and it is a matter of vital concern not merely to the community, but to the State, that these secular pulpits should be filled by well qualified men, and not occupied by empirics, shallow theorists, mimes, or political propagandists.

I am, Sir, yours, &c.,

J. S.

——— Mechanics' Institution,
27th December, 1852.

SIR,—We have had the Circular on the subject of Lectures in the ensuing Spring, issued by the Society of Arts. We regret that neither our funds nor our arrangements will permit us to avail ourselves of the aid thus offered. The truth is, for several years past we have tried the lecture system under the most favourable circumstances, with the best and the most popular lecturers we could procure, and we have, all of us, with one or two exceptions, come to the conclusion that there is but little of real good to be derived from it in its present shape. If we look to it merely as a means of replenishing our scanty resources, it but rarely effects this object; indeed I may say very seldom, or never, if we take the result of an entire session. The surplus, which a successful lecture leaves us, is sure to be swallowed up by one of its dull or unpopular successors; and as a means of conveying real lasting instruction, lectures, we find, are but of little use. To be able to follow a lecturer continuously, without losing the connection of the discourse, or missing the steps of the argument, implies some knowledge at least of the subject in hand; and this is the very thing which our people have not got. They want the very first elements of knowledge familiarly and clearly explained. We cannot expect, or get, if we expected, great lecturers, with half the alphabet attached to their names, to come down from their theories, and to teach the A B C of knowledge. Hence lectures which call for no exercise of the faculties, such as lectures on music, or comic displays, will always draw large audiences. I fear we shall never succeed in combining the theatre and the school-room together. It is an old complaint, and a true one, there is no royal road to learning, nor yet a flowery one; very irksome this, but so it is. As there seems to be some apparition "looming in the distance," as the phrase goes, of something or other being done for the *instruction* of the people,—leaving their *education* to those who ought to look after it, *parents* and *pastors*—could not your Society aid us, and others like us, in this matter? When we want lecturers, we know *where* and *how* to get them without going to your Institute's Committee. But what we cannot get are cheap books, cheap maps, cheap models, cheap diagrams, intelligent class-teachers, instructions as to how such classes should be organized, indications of what we ought to aspire to, and of what we ought to leave alone, as being beyond our scope. Assist us in these matters, and you will truly aid us, because we require help; what we can do for ourselves we shall be slow to ask others to put a hand to.

I am a director of the above Institution; but as I do not care to protrude my name on the public, I subscribe myself Your obedient Servant,

O.

## PROCEEDINGS OF INSTITUTIONS.

**Carlisle.**—On Tuesday evening, Mr. James Simpson, jun., delivered a Lecture to the members of the Mechanics' Institute, on "Meteorology, and the Instruments connected therewith." The lecture was divided into three parts. In the first, the nature of the science was explained; in the second, the various instruments used in connection with it, such as the barometer, thermometer, &c., and the principles of their construction were described; and, in the third, details were given of some of the most interesting facts connected with the science. The attendance was good, and the lecture, which was worthy of high commendation, was listened to with marked attention and interest.

**Hanley.**—A Lecture was delivered to the members of the Young Men's Christian Association, on the evening of Tuesday, the 28th ult., by the Rev. J. M. Martyn, on "Our World, its Governor and Government." The object of Mr. Martyn throughout was to disprove the arguments urged by sceptics that the world had not originated in the infinite wisdom of a Divine Maker; in doing which he took a comprehensive view of the wonders and beauties of creation, and particularly examined man in his mental and physical senses, and showed, by the most undeniable reasoning, how all to which he had referred established the truth of their creation by Providence.

**Leeds.**—The Rev. Professor Sedgwick, M. A., &c., recently lectured to the subscribers of the Leeds Mechanics' Institution and Literary Society, "On Glacial Phenomena in connection with erratic block of transport." After briefly sketching the general classification of geology with three great epochs, the Professor proceeded to state that the existence of blocks of granite, and other stone, in positions remote from their native rocks, had excited much speculation among philosophers, and various causes had been assigned for the phenomenon. He then considered and described the several operations of heat and water concerned in producing the present characteristics of the earth's surface; and the vast changes brought about by this agency. He showed by remarkably truthful views of Scawfell, and other mountains, the banks and strata of mist and fog, produced by warm vapours ascending from the valleys and encountering colder currents in the higher regions, so that at certain points great bands of vapour or cloud accumulated. Now, in Alpine regions this vapour was condensed into the condition of snow, and falling in localities where the temperature was rarely above freezing point, vast accumulations of snow and ice were formed in all the lofty points, and collected in all the higher valleys. In the channels where the water would naturally flow from the high regions, and where, in immediate contact with the rock, the higher temperature allowed some water to retain its fluidity, the snow, more or less condensed, and accompanied by fragments of ice, formed at the surface, or rolled down in avalanches, lay vast beds of scarcely fluid, and yet not quite solid matter, known as glaciers.

**Peterborough.**—The Members of the Mechanics' Institution met on Monday evening to appoint the officers of the Institution for the current year. There was not so large an attendance as on some former occasions; still a great many of the principal and most active Members were present. Mr. Whitwell, a Vice-president, occupied the chair. The Rev. William Strong, of Thorpe Hall, was unanimously re-elected President, and the Rev. E. Davys, and Mr. Whitwell, were re-elected Vice-presidents, and the following other officers were next chosen, namely; Treasurer, Mr. George Cattel (re-elected), Secretary, Mr. Robert Smedley (re-elected), who was thanked and highly complimented by the Chairman and Members for the efficient and willing manner in which he had discharged, during the past year, the arduous duties of the office of Secretary. Mr. Thomas English was also re-elected Librarian; and the following Members were balloted for to form the Committee of Management; namely, Mr. James Aitken (re-elected), Mr. R. Cornish, Mr. William Ruddle, and Mr. James Ruddle (both re-elected), Mr. J. F. Wilson, Mr. H. Lavington, Mr. B. Taylor, Mr. James Briston, and Mr. John Thompson, jun. The Curator will be appointed by the Committee at their next Meeting. Messrs. S. Rutland and R. Davison were unanimously chosen Auditors. After arrangements had been determined upon for engaging Mr. George Dawson to deliver two Lectures on the 11th and 12th April next, the Meeting adjourned until the following evening.

**Wandsworth.**—The General Quarterly Meeting of the Literary and Scientific Institution was held at their rooms, on Wednesday evening, the 29th ult. The minutes of the former meeting having been read and confirmed, five members were elected to serve on the Committee in place of retiring members. The Secretary then read a statement of the accounts, showing a balance of 18*l*. 17*s*. 2*d*. The Institution comprised classes for drawing, reading, grammar, and pronunciation, French, discussion, &c., a new and increasing museum, and a library containing about 200 valuable and well-selected volumes. The reading-rooms contained a good supply of daily, weekly, and monthly papers, periodicals, reviews, &c.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

G. R. (certainly not); H. A. T. (too late for this week); G. F. W., and G. H. (next week).

### QUESTIONS FROM CORRESPONDENTS.

*Omnibuses.*—Are there any reasons why omnibuses should not be made wider and higher than at present? (No. 18.)

*Shop Lamps.*—Do you know if there is any method of getting rid of the present unsightly, inconvenient, and awkward pendent lamps and reflectors for lighting shop fronts from the streets? (No. 19.)

*Mother-of-pearl.*—As there is a scarcity of this material in the market just now, I should be glad to know whether there are any unworked sources of supply, or whether there is any good known substitute fo it? (No. 20.)

*Enamels.*—Which is the best treatise on ancient enamels, and the method of applying them in practice? (No. 21.)

⁂ Our correspondent will find a communication on this subject in the next number of the Journal.

*Fuel.*—Are you aware of any natural materials on the route of any of the mail packets from this country which might be used, possibly in combination with some others, as a substitute for coal, so as to do away with the necessity of shipping large supplies for our ocean steamers? (No. 22.)

## MISCELLANEA.

**Photographic Exhibition.**—During the week some contributions of great merit have been added to the collection. Those of Count Montizon, taken from animals at the Zoological Gardens, are especially remarkable, both for the usefulness of the purpose to which the art has been thus applied, and the great skill in manipulation, without which such successful results could not have been produced. It is intended, if possible, to keep the Exhibition open until the end of January.

**New Application of Daguerreotype Apparatus.**—The Austrian government has ordered that when serious accidents shall occur on any of the railways belonging to the State, a daguerreotype shall be immediately taken of the train, in order to facilitate the investigation into the cause. For this purpose the daguerreotype apparatus is to be sent to all the stations. This system has already been adopted in Prussia with marked advantage.

**Portable Camera.**—Mr. George Stokes, who has been endeavouring, for some time, to reduce the cumbersomeness of the Camera, has recently brought out one which weighs only nine pounds with the shutter, and will take a picture eleven inches square. The shutter is so arranged that it will contain from twelve to twenty pieces of prepared paper, each piece between separate sheets of blotting paper. Light and air are completely excluded by the paper being pressed by the front portion of the shutter. When required for use, the first piece of paper is placed at the back of the glass, by the assistance of a very small hood. The impression is then taken, and by removing the millboard, the paper will fall back into its place. At the same time another piece can be brought forward ready for another picture before focusing; and so on to the end. The hood is made of India rubber cloth, and answers the purpose of a focusing-cloth, without the necessity of removal during the day. This simple arrangement has been found to be of great service, and to produce a saving both in time and trouble.

**Tyrian Purple.**—In a work by Mr. W. Linton, recently published by Messrs. Longman, "On Ancient and Modern Colours, from the Earliest Periods to the Present Time; with their Chemical and Artistic Properties," the following interesting description of the Tyrian purple is given at page 12.

"The renowned Tyrian dye was taken from a white vein in the throat of the shell-fish purpuræ. It was of a dark-red colour, resembling a deep rose. The purpuræ of the best description were chiefly found on the rocks of Tyre, on the coast of Asia; they were also caught at Meninge, on the Grætulan shores, in Africa; and on the coast of Laconia, in Europe. The colour varied according to the locality in which the purple fishes were taken. Those from Pontus and Galatia, being in the north, produced a black dye; in the equinoctial regions a violet hue predominated; whilst in the south, as at Rhodes, the colour was of a richer red. These purple fishes were also called Pelagia: and they were distinguished by the district as well as by the food which the district supplied. The Lutense lived in the mud; the Algense on sea-weed, the worst kind of all; and the Taniense, which frequented the bays and coasts, yielded the best, though not the deepest in colour. There are also the Calculosæ, which live in the gravel or shingly bottoms; and last, and most esteemed among the whole, the Dialeta, which are confined by their habits to no particular shore or food. Aristotle states that the largest fish come from the north, which are of a dark colour; and the smaller ones from the south, which are of a brighter red or yellow colour. Two hundred Buccina were added to one hundred and eleven Pelagian purples, to make the purple colour so much eulogized by Pliny, and one of the three shades of purple recorded by the ancients.

"The second of the three shades was the Punic or Phœnician purple red of Tyre and Tarentum—*Φοινικίδα*. The third was Conchyliata, made with Buccina alone; a violet tint, like that of the sea slightly agitated (and in shade).

"When Cornelius Nepos was young (in the time of Augustus), the violet colour prevailed; not long afterwards the red Tarentine purple was in vogue; and to this succeeded the double-dyed (*δῖβαφη*) Tyrian to which Horace alludes:—

'Te bis Afro
Murice tinctæ
Vestiunt lanæ.'

"After this, the Amethystine colour (the first of the three) was mixed with the Tyrian purple (the second named), which made the Tyriamethistus. The third, the Conchylia, or Buccinum Violet, was then united to the Tyrian dye (the second purple). To this succeeded other mixtures, dye upon dye, until the vegetable colours were resorted to for additional splendour and variety, and Kermes reds were plunged in the Tyrian crimson. To make a dye from purples they also mingled several kinds of fish, adding at one period, nitre, urine, water, salt, and Fucas (a Cretan plant, described in another page). But the dye from the Buccinum required only pure water.

"Purple stuffs were sacred from the remotest antiquity. Moses employed them for the vestments of the high priests, and for the ornaments of the Tabernacle (Exodus xxv. 4; xxvi. 1, seq.). They were twice dyed, and their value was equal to gold itself. The idols of Babylon had coverings of purple. The hero-princes of Homer were clothed with them. The colour was revered by all nations. It at once announced the dignity of the wearer."

The book is one of great interest, and its value is increased by the quotation of authorities.

**Railway Tyres.**—In consequence of the accident which occurred at Harrow the other day from the failure of a tyre, the Lowmoor Iron Company are at present engaged in a series of experiments for testing the best form of weld, and ascertaining the comparative strengths of a weld and of a plain piece of metal. It is understood that some of the results obtained are very curious, and tend to show that a perfect weld is possible, and that when made its strength is little less than the plain piece. The experiments are being made in a number of different ways, both as to extension and compression, and as to the effects of water.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette*, 31*st Dec.*, 1852.

*Dated 6th Dec.*

979. W. Quaterman—A gaseous engine.

*Dated 8th Dec.*

993. P. A. and C. Fontaine Moreau—Machinery for applying metallic capsules.

*Dated 15th Dec.*

1060. W. E. Middleton—Improved lubricator.
1061. P. D'Homme—Window blinds, curtains, and hangings.
1062. S. Walker—Clogs and patterns.
1063. G. Elliott and W. Russell—Boiling down saline solutions.
1064. J. P. J. Caplin—Apparatus for preventing or curing stooping of the head or body.
1065. J. Mason—Bleaching and dyeing.
1066. A. Robscheff—Separating gold, &c., from extraneous matters.
1067. C. J. Wallis—Amalgamating and grinding substances together.
1068. A. R. Groves—Heating, drying, and evaporating.
1069. R. Taylor and J. A. Phillips—Treating zinc ores.
1070. C. Dresser—Materials in substitution of whalebone, &c.
1071. T. Dunn and W. Watts—Machinery for altering the position of engines and carriages on railways.

*Dated 16th Dec.*

1072. P. A. and C. Fontaine Moreau—"Lamp omnibus."
1073. A. Cointry—Manufacture of bread and biscuits.
1074. J. J. Payne—Axle in two parts.
1075. C. Barlow—Bleaching, purifying, and concentrating sulphuric acid; partly applicable to other purposes.
1076. J. Healey—Application of glass and enamel to flyers, &c., used in preparing, spinning, &c., cotton wool, and other fibrous materials.
1077. R. Blades—Cleansing sewers.
1078. J. Stevens—Grinding and polishing lenses.
1079. Sir F. C. Knowle—Manufacture of iron.
1080. T. Mosley—Tablets, letters, &c., for indicating names, &c.
1081. A. E. L. Bellford—Stoppering bottles, &c.
1082. A. Slate—Propulsion.
1083. A. Slate—Motive power from elastic fluids.
1084. A. Slate—Propelling vessels.
1085. Dunlop—Saddles.

1086. G. Michiels—Manufacture and purification of gas.
1087. G. Sidney—Improvements in jugs, &c.

*Dated 17th Dec.*

1088. H. Kenyon—Grinding bones.
1089. F. J. Bramwell—Steam-engines.
1090. A. Slate—Slide valve.
1091. A. Slate—Invention in steam-boilers.
1092. R. W. Billings—Ventilating chimneys and apartments.
1093. W. Wilkinson—Looped pile and cut pile fabrics.
1094. A. Krupp—Improvements in cannons.
1095. J. F. Kingston—Reciprocating motion and propelling.
1096. J. Langridge—Stays.

*Dated 18th Dec.*

1097. J. Matthews—A burglary alarm.
1098. G. Thomson—Machine for cutting wood.
1099. T. Y. Hall—Safety-lamps.
1100. W. Robertson—Machines for spinning.
1101. T. Elliott—Steam-engines.
1102. J. A. Westerman—Carbonization of turf, and manufacture of paper and fuel therefrom.
1103. E. Schischkar—Dyeing and colouring.
1104. E. Schischkar—Colouring or staining.
1105. C. C. Boutigny—Improvements in distillation.
1106. J. Clay—Coal gas.
1107. W. East—Machinery for crushing clods, dibbling, drilling, and sowing seeds.

*Dated 20th Dec.*

1109. J. Durandeau—Marks and designs in paper.
1110. G. Lingard—Taps and apparatus for admitting air to beer, &c., under draught.
1111. W. Wilkinson—Improvements in manufacture of paper &c., and production of a substance applicable fo veneers, &c., and other purposes to which gutta percha and papier mache are applicable.
1112. P. A. and C. Fontaine Moreau—Night-stools, &c., aplicable to apparatus for containing fluids liable to decomposition.
1114. C. Watson—Carriage and stable brushes.
1115. W. J. Silver—Motion to capstan and other barrels.
1116. G. Gwynne and G. F. Wilson—Candles, night-lights, and soap.

*Dated 21st Dec.*

1118. F. D'Albert—Chemical substitute for indigo.
1120. J. B. Moinier and C. C. Boutigny—Distilling fatty matters.
1122. J. Akrill—Manufacture of bricks, &c.
1124. J. Akrill—Crucibles.
1126. W. E. Newton—Lamps.
1128. E. Mosely—Artificial masticating apparatus.

*Dated 22nd Dec.*

1130. A. V. Newton—Increasing draft of furnaces, and arresting sparks of locomotive engines.
1132. F. C. Hills—Purifying gas.
1134. J. F. Kingston—Motive power by electro magnets.
1136. T. Greenshields—Manufacture of alkali.
1138. T. Vicars, sen., and T. Vicars, jun.—Baking ovens, and method of placing bread therein.
1140. J. M. Hyde—Steam engines and production of steam.

APPLICATION WITH COMPLETE SPECIFICATION FILED.

1185. F. A. Calvert—Universal drill, 28th Dec.

*From Gazette, Jan. 4th*, 1853.

NONE.

## WEEKLY LIST OF PATENTS SEALED.

*Dated 31st Dec.*, 1852.

57. John Joseph Macdonnell, Temple-mead, Bristol—Improvements in the construction of railways.
84. Edwin Pettit, Kingsland—Improvements in the manufacture of ammoniacal salts and manures.
221. William Crosskill, Beverley, Yorkshire—Improvements in machines for cutting or reaping growing corn, clover, and grass.
250. William Armand Gilbee, 4, South-street, Finsbury—Improved mode of disinfecting putrified and fecal matters, and converting fecal matters into manure, also applicable to the disinfection of cesspools, drains, sewers, and other similar receptacles.
382. William Chisholm, Holloway—Improvements in the purification of gas, and the obtention of certain products during the process of such purification.
440. Fennell Herbert Allman, 16, Westbourne street, Hyde-park—Improvements in the manufacture and construction of brushes.
487. Archibald Slate, Dudley—Improvements in the manufa ture and construction of cores and core-bars, used in t production of hollow castings in iron and other metal
493. George Price, Birmingham—New or improved gas-stove
523. William Clarke, Manchester—Improvements in joints f connecting metals.
557. Robert Mallet, Dublin—Improvements in fire-proof a other buildings and structures.
558. Henry Robert Ramsbottom, Bradford, Yorkshire—Improvements in preparing and combing wool and othe fibrous substances.
644. George Shand, Glasgow, and Andrew M'Lean, Edinburg—Improvements in obtaining products from tar.
680. William Thomas Henley, St. John-street Road—Improvements in electric telegraphs, and in the apparatus an instruments connected therewith.

*Dated 5th Jan.*, 1853.

40. Frederick Richard Holl, Weymouth-terrace, City-road—Improvements in watches and Chronometers.
59. Marcus Davis, 5, Lyon's-inn, Strand—Improvements in the manufacture of carriages, carts, military and other waggons, and wheels for locomotive and other purposes.
127. Robert W. Parker, Roxbury, Massachusetts, United States—Improved mode of giving rotatory motion to a shaft of a circular saw or other mechanical contrivance.
100. Joseph Burch, Crag Hall, near Macclesfield—Improvements in building and propelling ships and vessels.
184. Joseph Needham, 26, Piccadilly—Improvements in breech-loading firearms, and in apparatus connected therewith.
191. John Stringfellow, Chard, Somerset—Improvements in galvanic batteries for medical and other purposes.
192. George John Philps, Friday-street, London—Improvements in hats and other like coverings for the head.
195. George Stuart, Glasgow—Improvements in heating the fleeces of natural coverings of sheep and other animals when on the animals.
206. John Moseley, Birmingham—Improvements in machinery for cleansing linen and other fibrous materials.
297. Alfred Kent, Chichester, Sussex—Improvements in glazing.
338. Robert Lambert, 13, Goree-piazza, Liverpool—Improvements in tents.
392. Joseph Burch, Crag Hall, near Macclesfield—Improvements in baths and bathing.
393. Joseph Burch, Crag Hall, near Macclesfield—Improvements in building ships and vessels for the purpose of saving lives and property in cases of shipwreck or fire at sea.
399. Joseph Hopkinson the younger, Huddersfield, Yorkshire—Improvements in steam-boilers.
400. Simon Pincoffs, Manchester, and Henry Edward Schunck, Rochdale—Improvements in the treatment of madder, and other plants of the same species, and of their products, for the purpose of obtaining dyeing materials.
415. William Beckett Johnson, Manchester—Improvements in stationary steam-engines.
419. John Henry Johnson, 47, Lincoln's-inn Fields—Improvements in the manufacture of sugar.
441. John Kealy, Oxford-street—Improvements in machinery or apparatus for cutting or slicing roots.
474. William Weild, Manchester—Improvements in looms for weaving certain descriptions of pile fabrics.
554. John Collis Browne, Fort Pitt, Chatham—Relief of individuals suffering from pulmonary affections or diseases of the chest.
570. Martin Watts, Patricroft, near Manchester—Improvements in machinery or apparatus for roving or preparing cotton and other fibrous substances for spinning.
582. James Sinclair, Stirling—Improvements in engines to be worked by steam, air, or water, the said improvements being also applicable to pumps.
645. Peter Fairbairn, Leeds, Yorkshire—Improvements in self-acting reeling-machinery for reeling flax and other yarns into hanks.
646. George Fife, Newcastle-upon-Tyne—Improvements in steam and water-gauges.
662. Peter Fairbairn, Leeds, Yorkshire, and John Hargrave, Kirkstall, Yorkshire—Improvements in machinery for opening, combing, and drawing wool, flax, and other fibrous materials.
719. Sir Charles Fox, Knt., New-street, Spring-gardens—Improvements in roads; being a communication to him from a foreigner abroad.
726. John Henry Johnson—Improvements in reaping-machines and in apparatus connected therewith; being a communication to him from abroad.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Dec. 30 | 3404 | Improved ever-pointed Pencil. | Messrs. Williams and Jackson | Birmingham. |
| Jan. 4 | 3405 | Bolt. | Webb and Greenway | Birmingham. |
| ,, ,, | 3406 | Belt-fastening. | Charles Eyland | Walsall. |
| ,, 5 | 3407 | Belt-fastening. | Charles Eyland | Walsall. |

# SOCIETY OF ARTS.

FRIDAY, JANUARY 14th, 1853.

## SIXTH ORDINARY MEETING,

*Wednesday, January 12th*, 1853.

The Sixth Ordinary Meeting of the Society was held on Wednesday, the 12th instant, James Meadows Rendel, Esq., F.R.S., Vice-president, in the Chair.

The following were elected Members:

Allcroft, John Derby, 5, Oxford-square, Hyde-park.
Appold, John George, 23, Wilson-street, Finsbury.
Bethell, John, 8, Parliament-street, Westminster.
Collins, William Whitaker, 15, Buckingham-street, Adelphi.
Dobson, Miss, 22, Doughty-street, Mecklenburgh-square.
Ferguson, Joseph, M.P., Reform Club.
Freeman, Joseph, 19, Artillery-place, Finsbury.
Fussell, Alexander, 2, Oakley-square, St. Pancras.
Guinness, Arthur, 70, King's Road, Brighton.
Harnage, Sir George, Bart., Bellaswardine, Shropshire.
Hawkshaw, John, 33, Great George-street, Westminster.
Knight, J. Jordan, 37, Camden-road Villas.
Manby, Charles, 25, Great George-street, Westminster.
Mayall, John Edwin, 224, Regent-street.
Noldwritt, John Spencer, 11, Albany-road, Camberwell.
Penn, John, Greenwich.
Radford, William, 8, Great George-street, Westminster.
Simpson, William, 2, Eccleston-street, Chester-square.
Thomas, Frank, Bruton-street, Bond-street.
Trueman, Edwin Thomas, 23, Old Burlington-street.
Way, Major, R.A., Sudbrook-park, Richmond, Surrey.
Westbrook, Andrew, Freeman's-court, Cheapside.
Woods, Edward, 21, Upper Southwick-street, Cambridge square.
Wright, Thomas Cooke, 18, Upper Gower-street.

And the names of 28 Candidates for Membership were read.

A Paper was read by Mr. C. Shepherd, Jun., "On Improvements in Electric Clocks, and the Means of Working the Greenwich Time Signals."

The Author divided the subject into two parts. In the first, a short history of the application of Electro-magnetism to horological purposes, with an account of recent improvements was given; and in the second, the clocks which had been constructed for the Royal Observatory, and the arrangements which were there made for transmitting Greenwich Time Signals, and dropping the time balls, were described.

Soon after the discovery of the dry pile by De Luc, the electrical attraction and repulsion of that instrument was applied, as a motive-power, to light pendulums, many continuing to act for months together. In 1815, Zamboni applied a mechanical contrivance to the pendulum, by which a train of wheels was kept in motion; and thus made, it was believed, the first clock in which electricity was the only motive-power employed, though it more resembled a philosophical toy than a clock. In 1819, the discovery of Oersted, relative to the influence of an electric current on a magnetic needle, opened a new field for inquiry, and many important applications were proposed, among which the Electric Telegraph stood pre-eminent. Another result of the discovery of Oersted was the electro-magnet, or the power of conferring upon a bar of soft iron any degree of magnetism by the proper application of an electric current.

In the year 1837, Professor Wheatstone obtained, in conjunction with Mr. W. Fothergill Cooke, a patent for Electric Telegraphs, in which was included an instrument for exhibiting the letters of the alphabet in succession, in an opening made in the dial-plate, the letters being arranged round the rim of a disk; or a hand was made to point to the letters arranged round the dial, the circuit being made and broken by hand. It occurred to Professor Wheatstone, that if the apparatus for making and breaking contact was moved by a clock, and figures were substituted for the letters on the dial of a telegraph, then that telegraph would become a clock, each movement of the seconds' hand producing a corresponding motion. This was carried out by Mr. Dent, in the year 1840, when the clock was exhibited in the rooms of the Royal Society, and Professor Wheatstone read a paper on the subject. In the succeeding year Mr. Bain applied for a patent for improvements in the application of motive power to clocks, in which he specified a method of applying electro-magnetism to that purpose, almost identical with the letter telegraph just mentioned. In 1843, Mr. Bain obtained a second patent, in which an ingenious method was described for communicating motion to the pendulum, by electric currents of very low intensity.

At this time Mr. Appold proved experimentally, that a slight alteration in the quantity of electricity produced a great difference in the rate of the clock; and by the application of a new form of break, which kept the pendulum more nearly to one length of vibration, he much improved its performance.

About seven years ago Mr. Shepherd's attention was directed to the application of electro-magnetism as a motive power for clocks; and on considering the nature of that power, and the continual variations to which it was subject, from the changes which were constantly taking place in any form of galvanic battery, it at once became evident that any direct application of electro-magnetic force to the pendulum must be fatal to its performance; for every change in the power of the galvanic battery would produce a corresponding change in the length of its arc of vibration, and consequently in its rate, if not perfectly isochronous. To obviate this difficulty the idea occurred of causing an electro-magnet to raise a weight, or bend a spring to a certain fixed extent at each oscillation of the pendulum; and to employ the gravity of the weight, or the elasticity of the spring, to impart the necessary impulse. By these means the continually varying force of the electro-magnet was regulated exactly by the amount of power which the pendulum required to continue its motion.

The arrangement which had been made at the Royal Observatory, Greenwich, at the Tonbridge Station of the South-Eastern Railway, and several other places, was then described. A brass bracket was fixed on the bed-plate of the clock, to the left of the pendulum rod, into the lower part of which the pivot of a small axis was introduced. To this axis two levers were fixed at right angles to each other, the one horizontal, the other vertical. On the horizontal arm there was a small sliding weight for giving the impulse to the pendulum. The pivot of another axis was introduced at the top of the bracket, and this also carried two levers at right angles to each other, the horizontal lever having a sort of latch-shaped point, and forming what was technically called the detent. The relative positions of this latch-pointed lever, and the point of the perpendicular lever on the lower axis, were so adjusted that when the horizontal weighted lever was raised, the point of the vertical lever passed the latch-shaped point of the detent. Two projecting points, attached to the pendulum-rod, were so adjusted, that when one of them, called the discharging point, pressed against the vertical lever, so as to raise the detent, the other, or impulse point, would be almost in contact with the vertical arm of the weighted lever. A compound lever was so arranged that one end carried an iron keeper over the poles of an electro-magnet, while the other was beneath the horizontal weighted lever, so that when the magnet was excited, the motion of the lever to which the keeper was attached raised the weighted lever, and locked it on the latch-point of the detent. The contact on which the transmission of the galvanic current through the coils of the electro-magnet depended, was made and broken by the pendulum touching a platinum spring each time it moved to the right.

Its action was as follows:—the pendulum moving to the right touched the break spring, thereby completing the galvanic circuit through the coils of the electro-magnet, which moved its keeper, the lever to which it was fixed, and also lifted the impulse lever. When the pendulum moved to the left, the reverse of this took place, the discharging point pressing against the perpendicular lever and lifting the detent. At the completion of the vibration to the right, the pendulum touching the contact spring, again caused the electro-magnet to raise the impulse weight; and, on moving to the left, it lifted the detent and received another impulse.

The connection of the pendulum with the necessary wheels for carrying the hands to indicate the time on dials, and the method of moving one or more such arrangements sympathetically, were next described. After making many experiments, the author proved that by far the best arrangement for moving distant clocks by galvanic currents was to use the attractive and repulsive forces of two electro-magnets, exerted simultaneously on the opposite ends or poles of permanent bar magnets. The clocks consisted of a small frame of brass, into which the pivots of the ordinary wheels for reducing the motion of the seconds' wheel to that of the hour and minute hands, were introduced; two electro-magnets, one on each side, being also fixed to it. An axis at the upper part of the frame had two or more permanent bar-magnets fixed at right angles to it, in such a position that their poles should be immediately over those of the electro-magnets; and on the same axis were fixed, what were technically called the pallets, consisting of two arms having inclined planes at their extremities, which being pushed alternately against the teeth in the seconds' wheel, caused it to revolve, step by step, and so communicate motion to the train of wheels, and consequently to the hands. If an electric current was transmitted through the coils of the electro-magnets, so as to cause one side of the clock-frame to attract the permanent magnets, while the other repelled them, the axis on which the magnets were fixed would make a partial revolution, and the pallets acting on the seconds' wheel would drive it forward one step, or second.

The free negative pole of one battery terminated in a platinum-pointed spring on one side of the pendulum-rod; the wire from the free positive pole of the other battery ending in a similar way on the opposite side. While the pendulum was perpendicular, neither circuit was complete, but on swinging to either side the circuit was completed simultaneously with its vibrations. A pendulum and two dials, fixed at the Electric Telegraph Station at Tonbridge, were set to Greenwich mean time on the 12th of April last, and on comparing them on the 21st of August, they were found to be only 21 seconds fast. From that time their rate was taken daily; and on the 1st of October, after seven months uninterrupted action, they were only 8 seconds fast. The author believed that the performance of these clocks might still be improved by giving the impulse to the pendulum in the middle of its vibrations, and by using water for completing the circuit instead of springs. To accomplish this, advantage had been taken of the slowness of action of an electro-magnet, and a peculiar form of remontoir escapement, superior, both theoretically and practically, to that generally in use, had been adopted with success at the Royal Observatory, and was much approved by the Astronomer Royal.

The author next proceeded to describe the arrangements which had been made at the Royal Observatory, Greenwich, for transmitting mean time signals, through the medium of the Electric Telegraph, to all parts of England. This was effected by breaking the contact in three places; namely at the twenty-four hour wheel, the one-hour wheel, and the one-minute wheel. No signal could therefore pass until these three contacts were made simultaneously. The means adopted for accomplishing this object were then described. Two metal springs were fixed parallel to each other on a block of ivory, so as to insure perfect insulation. A pin was fixed to an arm carried by the axis of the seconds' hand which, coming in contact with an inclined plane fixed to the upper of these two springs, caused it to make contact with the other. The inclined plane was of such dimensions that the contact between the two springs was maintained for one second only. As the seconds' hand revolved once a minute, it was evident that this contact between the springs would take place at intervals of equal duration. The contact pin and seconds' hand were fixed to the arbor of the one-minute wheel in such a manner that when the latter pointed to the sixtieth second, the two springs were pressed in contact by the pin. A similar pin to that carried by the seconds' wheel, and acting on two other metal springs in the same way, was attached to the axis of the minute-hand. The contact between these two springs was made half a minute before, and broken half a minute after each hour.

In the twenty-four hour wheel twenty-three pins were screwed, which acted upon a third pair of springs insulated in the same manner as those already described. In this case, however, the contact was made five minutes before each hour. An ordinary sand and acid-battery, consisting of seventy-two elements, had one of its poles connected, by means of gas-pipes, with the damp earth at Greenwich, the opposite pole being connected with the upper of the two one-minute contact springs. At five minutes to any hour, except one o'clock, one of the pins in the twenty-four hour wheel made and maintained the contact between its two springs. At half a minute to the hour, the one-hour contact was made by the movement of the minute hand. The third and last contact still remained broken; but as the seconds' hand dropped to the sixtieth second of the last minute of the hour, the one-minute contact was made. This the only remaining break in the circuit being now closed, the galvanic current instantaneously passed.

Another pair of springs placed on one side of the twenty-four hour wheel was fixed at such a distance from the face of the wheel, that the whole of the twenty-three pins, except one which was much longer than the rest, passed without touching them. This long pin corresponded to one o'clock, and its object was to complete, automatically, a galvanic circuit through the coils of two electro-magnets, which, by their attractive force, exerted upon a piece of iron, released the Greenwich time-ball. At present a circuit of 10½ miles, being the longest distance, it was believed, through which electro-magnetic clocks had yet been practically worked, was in successful operation.

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The **Chairman** remarked, that in this practical age, it was essential to consider not only the scientific, but the practical interest of such a subject as that now brought forward; for it was as much the duty of a Society like the present to make science popular and interesting to practical men, as to make it interesting to scientific men.

**Mr. E. B. Denison** observed, that Mr. Shepherd's invention was, perhaps, one of the most ingenious applications of electricity; and knowing the conditions which clocks ought to satisfy, he might say that Mr. Shepherd's mode of effecting his object was superior to that of any other person. He, however, believed, that the invention described in the paper did not possess that extreme practical advantage over clocks going by the old-fashioned principle of gravity, that had been supposed. The escapement adopted by Mr. Shepherd, in its latest and most improved form, was nothing else than a dead escapement, with a constant force. Beginning, as all inventors did, with a remontoir escapement, Mr. Shepherd had found there was something wrong in it; and, like the rest, had returned to the ordinary dead escapement. A tooth could be lifted on to a dead pallet by a constant force, as well as by electricity. The question therefore was this; how was electricity better than gravity? He very much doubted whether an electric clock could be made more cheaply than a gravity clock; and certainly, if the clockmakers would dispense with a great deal of polishing and getting up, a dead escapement clock would be much the cheapest. It was true Mr. Shepherd's clocks did not require winding up; but it would be necessary to engage some person to keep them in order,—and that could not be done for less than the cost of winding up and repairing a dead escapement. Mr. Denison then proceeded to state that there was a prospect of that great problem of clockmaking—a perfect gravity escapement—being solved. In fact it was done. Within a few yards of that room there were two clocks going with a gravity escapement, giving a constant force to the pendulum, without any friction. One of these was intended for the New Houses of Parliament. With respect to the electric telegraph, it would be remembered that an electric clock, and a clock to work a number of dials at a distance, were different things. The latter object was effected in the clock made in 1840 by Mr. Dent for Professor Wheatstone; the connection being made by gravity instead of by chemical means. If, therefore, a clock could be made with a proper gravity, or dead escapement, so as to keep time within a second in a week, and if it would work other dials at a distance, what more could be required? The plan of carrying two plates dipping into two jars at the ends of the pendulum cross-head, was not very elegant, and involved some degree of resistance, though it might lead to something better. In reference to the Greenwich time-ball, Mr. Denison believed that there was no difficulty in letting off a heavy hammer of a striking clock at any required moment, without the intervention of three sets of hands.

**Mr. Latimer Clark** thought the plan of dipping the metallic plates into jars would be found objectionable, after the action had been maintained for some time; because the two metals might wear away unequally, and so destroy the balance of the cross-head. With respect to the time-ball in the Strand, Mr. Clark said it had been in action three or four months without any failure, and the clock in connection with it had only stopped twice, and then from the rain penetrating the case.

**Mr. C. V. Walker**, speaking from long experience of Mr. Shepherd's clocks, could testify to their general excellence. Those at the Tunbridge station had been in operation for a year and a half, and had worked in a perfectly satisfactory manner, with a very feeble battery power.

**Mr. Shepherd**, in reply, observed, that he thought Mr. Denison had mistaken the object of electric clocks, which was not so much to make one perfect clock, as to be able to transmit time simultaneously to a number of others. This had been successfully accomplished.

**Mr. Alderman Spiers** moved, and **Mr. W. De la Rue** seconded a vote of thanks to Mr. Shepherd, which was carried unanimously.

## INSTITUTE LECTURES.

REPORT from the Institutes' Committee to the Council, in reference to the delivery of Lectures at the Institutions in Union with the Society of Arts.

The Lecture-schedules, which, under your authority, were issued on the 24th of November last to the Institutions in Union with the Society of Arts, having been returned by 137 of the 236 Institutions to which they were sent, the returns have been very carefully considered, as well as the letters by which many were accompanied, and your Committee now beg leave to report the results at which they have arrived.

It has been already stated, that, although the Schedules were sent to 236 Institutions, returns were made by only 137; and it must be added, that not more than eighty-three expressed a desire that arrangements should be made for lectures for them during the ensuing spring.

It will be remembered that the arrangements proposed to be made were merely provisional for the Spring Course; and that the publication of anything like a complete plan of lectures, was postponed until the views of the lecturers, as well as the wants and capabilities of the Institutions, could be more fully ascertained, by correspondence with them, by discussion in the Journal, and by conference with the Representatives.

The desire of this Committee is, in all its proceedings to consult the Institutions, and to promote in them the growth of what is requisite for their improvement, rather than to attempt to bring in upon them from without a plan of improvements for which they are unprepared.

The Committee, however, regret to be obliged to report that a large number of the eighty-three Institutions which have requested that lecturers should be engaged for them, have named such low fees as to make it impossible to engage for them lecturers of such qualifications as the Institutions would expect to obtain through the medium of this Society. Of these Institutions, two are in Ireland, one is in Scotland, and the rest are scattered over the whole of England and Wales, from the Tweed to the Land's End. The total number of lectures required is 306. The lowest fee offered is 1*l*., the highest, is 5*l*. 5*s*., per lecture, to include travelling and other expenses. Thirty lectures are requested at fees not amounting to more than 40*s*. each.

Those which offer 4*l*. and upwards, are:

Aberdeen.—For *Dominant Ideas of different Ages;* and *Characteristics of Great Writers.*

Barnsley.—For *Dominant Ideas of different Ages;* and *Characteristics of Great Writers.*

Carmarthen.—For *Music and its Influence;* and *Music as a part of Education.*

Dundalk.—For *Electricity and Magnetism, with practical applications; Chemistry applied to Agriculture;* and *Sanitary Improvements, and their Influence.*

Durham.—For *Electricity and Magnetism, with practical applications; Volcanoes and Earthquakes;* and *Antiquities of Nineveh.*

Grantham, Philosophical Institution.—For *Volcanoes and Earthquakes; Dominant Ideas of different Ages;* and *Music of different Countries.*

Highgate.—For *Physical Geography;* and *Oratory and Orators.*

Leek.—For *Music and its Influence.*

Loughborough.—For *Music and its Influence.*

Nottingham.—For *Dominant Ideas of different Ages:* and *Characteristics of Great Writers.*

Salisbury.—For *Science, its Influence on the Arts of Life; Dominant Ideas of different Ages; Characteristics of Great Writers;* and *Music and its Influence.*

Shelton.—*For Volcanoes and Earthquakes.*

For lectures on "Chemistry (general)" only three Institutions have applied, Chepstow, Huntingdon, and Tewkesbury. It is, therefore, impossible to provide these Institutions with lectures on this subject. For "Chemistry in connection with Agriculture," six Institutions, one of them in Ireland, have applied. These are insufficient to form the basis of any combination which the Committee could hope to make on terms mutually beneficial to the lecturers and to the Institutions.

The same remark applies to the subject of "Oratory and Orators," for which only seven Institutions in widely distant localities have made application.

For "Capital, Labour, and Machinery" only two have applied; but to these the Committee hope to be able to lend two MS. lectures, to be written for this Society, by a high authority.

For "Emigration;" "Sanatory Improvements, and their Influence;" "Drawing, and its Uses;" "How to look at a Picture;" and the "Music of different Countries," the applications are respectively eight, nine, five, seven, and five; from widely distant localities, presenting no sufficient opportunity for the requisite combination.

For "Gas and its Applications" there are only three applications; and the terms offered are 1*l.* 10*s.*, 2*l.* 2*s.*, and 2*l.* 2*s.*

For the "Antiquities of Nineveh" there are twenty-one applications, the whole of which the Committee hope to provide for by the loan of two MS. lectures, composed expressly for this Society, by Mr. A. H. Layard, M.P., who desires thus to testify his interest in the undertaking.

The subjects of "Dominant Ideas of Different Ages," and "Characteristics of Great Writers," will be provided for by MS. lectures, to be written for the Society, by the Rev. Derwent Coleridge, M.A.

It is proposed to lend the MS. lectures to the Institutions in Union, at the charge of half-a-guinea for each delivery.

The applications for the following subjects have been committed respectively to the following gentlemen, viz.—

"Physical Geography," and "Volcanoes and Earthquakes," to W. Hughes, Esq., F.G.S.

"Music and its Influence," and "Music as a part of Education," to John Hullah, Esq.

Although the Committee could not invite, nor expect, these gentlemen to accept the very low fee which in many instances, as stated, has been offered, it is hoped that they will be able to make satisfactory arrangements with some of the Institutions; and they have undertaken to communicate with all.

The remaining subjects of "Science, its importance as part of Education," "Science, its influence on the Arts of Life," and "Electricity and Magnetism, with practical applications," it is hoped will be provided for in the same manner as those last mentioned.

Six institutions near Shrewsbury must be especially mentioned,—they are the Chester Mechanics Institution, Ludlow Literary Association and Mechanics' Institution, Newport (Salop) Mechanics' Institution and Literary Society, Oswestry Young Men's Institute, Shrewsbury Literary and Scientific Institution, and Wrexham Literary Institution.

These Institutions not only agreed upon the same subjects, but also arranged and suggested a plan by which the lectures could be delivered consecutively. If their example in this respect should be generally followed in future, the work of geographical combination and arrangement would be greatly simplified; and there is reason to hope that the efforts of the Society in this direction will be crowned with success. A very large number of the Institutions had completed their arrangements for the Spring Course before the Schedules were issued. Many pleas of poverty, which have now justly been put in, will have no existence when the more general recognition of the importance of these Institutions has recruited their resources; and when, new ones arising and being brought into union with the Society, the lecture districts shall be more thickly peopled with Institutions requiring lectures, the work of combination will be comparatively easy.

(Signed) Harry Chester,
Chairman of the Committee.

12th January, 1853.

## FOREIGN POSTAGE REFORM.

The following very important communication has been received from Don Manuel de Ysasi, the Honorary Secretary of the Association to Promote a Cheap and Uniform System of Colonial and International Postage:

St. Petersburg, 20th Nov. (2nd Dec.), 1852.

My Lord,—Having been solicited by the Council of the International Postage Association in October last to proceed to the seats of the governments of the principal countries of Europe, with a view of ascertaining their sentiments in respect to the objects of the Association, and their readiness to acquiesce and co-operate in the alteration of the system of postage at present in force on the continent, I have now the honour to lay before your Lordship, as the President of that body, the result that has concluded my labours as far as regards the government of this most important empire—Russia.

Shortly after my arrival here I had the honour of submitting the letter of the Association, under date October 18th, to the notice of the Postmaster-General, who, in this country, has the sole and entire management of the affair of the post. In the interview, His Excellency expressed his pleasure at hearing of the objects of the Association, and instanced the fact that already in this country two important elements of the plan are in full operation; namely, uniformity of charge to all parts of the empire, irrespective of distance; and necessity of pre-payment.

His Excellency expressed not only his willingness, but his desire to become acquainted with the details of the proposed plan, and requested me to furnish him with a sketch of it, that he might give it his attention.

I therefore drew up a short letter, of which I beg to enclose a copy, in which I endeavoured to explain the intentions of the Association, and which I intended might serve as a general letter to the other courts, which were to be visited subsequently. This I forwarded to His Excellency, with a request that he might give it his immediate attention, as I purposed leaving St. Petersburg in a short time.

On the 22nd November I had the honour of receiving a letter from him, of which I also enclose a copy, as also one addressed to me individually.

The tenor of these two letters is so fully and entirely in accordance with the wishes of the Association, that I am sure they will participate with me in the very great pleasure and satisfaction that their perusal afforded. It was necessarily impossible to request from him any *pledge* that the Russian Government would carry out to the full extent the ideas of the Association; but I am sure that his Excellency's feelings are so entirely in accordance with those of the Association on the subject, that he only waits for the concurrence of the other European governments to assist to the utmost in carrying out their plans.

I need scarcely, I trust, express the pleasure that this success has afforded me, and I can only trust that I may meet with equal good fortune in the other countries which I propose visiting on behalf of the Association.

I have the honour, &c.,
(Signed) MANUEL DE YSASI.
To the Right Hon. the Earl Granville, &c.,
President of the International Postage Association.

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International Postage Association,
Society of Arts, London, 15th October, 1852.

YOUR EXCELLENCY, — This Association having already had the honour to address the several foreign powers through the ambassadors at this court on the subject of a reform of the present complicated system of International Postage, we take the liberty to present this letter through our secretary, who will arrive in a few days in St. Petersburg on this business.

We are aware that many treaties are in force which could not be set aside except by mutual consent; but this consent will never be obtained until a new, general, and uniform system shall be offered as a substitute for these treaties; it is with this view that we present to your Excellency a plan which appears to us, after much consideration, to be the best that can be adopted.

The plan consists of the three following articles:—

1. Each country to determine, according to its own judgment, a postage-rate for foreign letters, provided that this charge be the same for every country entering the Postal Union and for every portion of the country. The postage in all cases to be paid in advance.
2. Each country shall engage to receive and deliver to its address, clear of all charges, every letter sent by the post from the countries included in the convention, and intended for any part of that country.
3. Each country shall also undertake to convey through its territories, without charge, every letter passing through it to any other state in the proposed Union.

It is on these three points that we have the greatest desire, as being the first step towards the accomplishment of so important an object, to obtain the opinion of foreign powers; and it is for this alone that we have instructed our Secretary to solicit of your Excellency a few lines in reply to the letter (a copy of which is enclosed herewith) expressing your approbation, and stating that you are ready to co-operate in a project calculated to produce such great and permanent benefits.

If your Excellency should agree with any of the three above articles, and not with the rest, we shall be greatly obliged if you will specify the points which you do not approve.

(Signed) for the President and Council,
MANUEL DE YSASI, Hon. Sec.
To Comte W. D'Adlerberg, &c., &c., St. Petersburg.

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St. Petersburg, 10th Nov. (20th Nov.) 1852.

SIR,—In reply to the communication bearing date the 18th October, addressed to me by the International Postage Association, I have the honour to inform you that I entirely concur with respect to the advantages which would result from making the charge upon letters uniform and as low as possible.

In Russia, where this system established for several years, is in full force, letters from one end of the Empire to the other are charged uniformly ten copecs for the half ounce.

As regards the project for establishing a similar low and uniform charge on all letters passing between the Russian empire and foreign countries, on the basis laid down in the letter of the 15th October, which has been sent to me in the name of the Postage Association by you, as its Honorary Secretary, I have the honour to inform the honourable Association, that for my part I see no inconvenience in taking the proposition into consideration, and that I shall with pleasure furnish the necessary information for carrying it into effect so soon as the Governments of the respective foreign powers shall place themselves in direct and official communication with the Imperial Government.

I have the honour, &c., &c.,
(Signed) COMTE W. D'ADLERBERG.
President of the Postage Department of the Russian Empire.
Don Manuel de Ysasi, &c., &c., &c.

## COLONIAL PENNY POSTAGE.

THE Council of the Colonial and International Postage Association, as will be seen by an advertisement in another part of our paper, has come to the following resolution upon the important question of our Colonial Postage:

> "That the first object of the Association is to extend the system of uniform penny postage, already in operation between the United Kingdom and the Channel Islands, to the whole of the British Colonies and possessions. The total amount of postal revenue derived from all the Colonies does not exceed 200,000*l*. a year. The whole, obviously, could not be sacrificed by the measure proposed; but it would be sound national policy to abandon even the whole to promote in so eminent a degree the commerce, education, freedom of communication and friendly relations between the Colonies and the mother country."

The amount of revenue derived from the Colonies is extracted from the MS. return obligingly furnished by the Post-master General at the request of the Council of the above Association, and printed at length in our Journal of the 10th December. In that return the income from Transmarine Colonial Postage, by each line of packets, stands as follows:

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| French Mail | £16,016 |
| Belgian | 630 |
| Prussian | 1,636 |
| Dutch | 766 |
| Hamburgh | 1,548 |
| American | 33,237 |
| West Indian | 23,884 |
| Cape | 5,115 |
| Peninsular | 3,627 |
| India viâ Southampton | 42,605 |
| India viâ Marseilles | 36,413 |
| Sydney, &c. | 5,730 |
| African | 383 |
| Intercolonial Postage | 15,016 |
| Red Sea Postage | 6,405 |
| | £193,011 |

## HOME CORRESPONDENCE.

### GREAT EXHIBITION SURPLUS.

SIR,—Considering the great interest with which the announcement of the intentions of the Royal Commissioners with regard to the disposal of the Exhibition Surplus was looked for by the public, it is a matter of surprise that their Report has hitherto met with so small a share of criticism, the columns of your journal last week containing, under the signature of Δ, the first serious onslaught which has been made upon their application of that celebrated fund. The advantages of the attack over the defence of a position are well known, and any attempt effectually to repulse the whole of Δ's skilfully planned assaults would occupy more space than you could probably spare; but I trust I may be permitted to state, in a few words, the grounds on which I am disposed to take a somewhat less desponding view of the prospects of the "Cabbage-garden at Kensington-gore" than that entertained by Δ.

In considering this question we must not lose sight of the fact that 170,000*l.*, although in itself a good round sum, is totally and obviously inadequate to the establishment and maintenance of a National Institution of any description on a scale at all commensurate with the grandeur of the memorable undertaking to the success of which the surplus is indebted for its existence; and it would seem probable that the very smallness of the sum, when compared with the extravagant expectations to which it gave rise in many quarters, may not have been the least of the difficulties with which the Royal Commissioners have had to contend in deciding on the use to which it should be applied.

Your correspondent objects to the scheme proposed in the Report, both on the score of impracticability and inexpediency, and he thinks that, granting the purchase of land to have been in other respects a judicious measure, the choice of site has been a bad one.

I have neither the right nor the desire to put myself forward as the champion or apologist of the Royal Commissioners (who, I doubt not, are well able to defend themselves), and I know no more of their proceedings or intentions than can be gathered from their published Report, which, whilst it contains some points to which exception may perhaps justly be taken, does not appear to me by any means to merit the sweeping condemnation pronounced upon it by Δ. The vast and comprehensive scheme shadowed forth in that small blue book is composed of many parts, some of which may possibly prove to be neither feasible nor desirable; but it must not be forgotten that each or any one of them may be carried out by itself quite independently of the remainder, and the real question at issue is, not so much whether the whole scheme is practicable or otherwise, as whether or not such portions of it as can be carried out are likely to amount to a great national benefit.

The arguments employed by Δ against the proposed Industrial College rest on the assumption that no want can exist in a community without its being perceived, and that no sooner is it perceived than effectual steps are taken for its removal by those who feel it; in illustration of which we may take the case of some of the tribes of the interior of Africa, who, living in a climate which may be described as being rather warm than bracing, find a thin coat of grease to be sufficient clothing, and, consequently, have not as yet found it necessary to establish cloth or calico manufactories in their country, although some of their neighbours on the shores of the Atlantic, influenced, no doubt, by the dampness of the sea breeze, are beginning to evince a partiality for the products of Lancashire. Now there can be no doubt, if Δ's theory be correct, that were the climate of the interior to become, by some natural (or unnatural) convulsion, somewhat more rigorous than it is, a second Leeds or Manchester would at once spring up in the desert for the purpose of providing clothes for the shivering savages. Some instances nearer home might, however, be adduced, which would appear somewhat to militate against this theory; as, for example, the Great Exhibition itself, which, considering its early struggles and the violent opposition it met with, can hardly be said to have been felt as a national want, although now acknowledged on all sides to have been a great national benefit. Instances less remarkable, but perhaps equally convincing, might be multiplied to any number, were it necessary, for the purpose of showing that the absence of any loudly expressed feeling in behalf of an Industrial College is not to be taken as amounting to anything like a conclusive argument against the want of such an establishment being really felt, and much less so as against its true, although, perhaps, not fully understood utility. If we are to take as a type of the English people Δ's high-minded and independent youth, who is described as being so full of proper pride and self-respect, that he disdains to stand indebted to any man even for knowledge, and will not condescend to be taught unless he is able, "on equal terms," to impart instruction in return, it must be acknowledged that the difficulty of obtaining pupils for the contemplated College will be considerably greater than was probably anticipated by its proposers; but, for my part, I believe that "Young England" has not yet grown quite so self-sufficient as Δ would have us think, and that we have yet amongst us many persons mean-spirited enough to consent to receive instruction, when they have reason to believe that it will be beneficial to them. Not satisfied with informing us of the impossibility of finding pupils willing to learn, Δ goes on to show that it will be equally impracticable to procure competent instructors willing to teach. I do not believe that there is any scarcity in this country of well-qualified persons ready, for a fair remuneration, to undertake *any* duty: and if it be true (as Δ thinks) that the School of Mines has not benefited the public to a degree sufficient to justify the sums expended upon it, at least its failure cannot be said to be the result of the occupation of its chairs by "inferior hands or pretenders." This part of the scheme, however, involves considerations of a magnitude and importance which preclude its being satisfactorily handled within the limits of a letter; the whole matter will, no doubt, be fully sifted, and the final verdict of the country given upon the evidence.

The fact is, that gigantic as have been the strides made by this nation during the last century in the path of civilization, we are as yet very far from having reached its extreme limit; and if we wish to maintain the honourable place which we have attained in the industrial race, we must not pause to congratulate ourselves, but keep pushing on, lest we be overtaken and passed. Above all things, we must avoid that overweening self-confidence, which would teach us to believe that because we now stand first among nations in commerce and in some of the industrial arts (the Exhibition has shown us that we are far from being first in all), we may expect always to keep the same place without constantly renewed exertions on our part.

Technical instruction, however, is very far from being the only kind of art-education required in this country. It would seem that we have yet to learn the rudiments of taste in the Fine Arts. Why is it that in this great metropolis there is hardly a building to which an Englishman can point with pride and satisfaction, which is not at the same time a relic of a past age? Why is it that notwithstanding the acknowledged merit of some of our sculptors, we have scarce a statue or a public monument that would not be a disgrace to a provincial town? Why is it that our high places are disfigured by such outrages on good taste as the brazen giant in Hyde Park, and the equestrian monster on Constitution Hill? Why is it that the "finest site in Europe" is occupied by a building the very name of which is an insult to the nation? Are we to suppose that an Englishman is naturally incapable of comprehending the difference between the true and the false in artistic taste? is the burden of our song always to be

"Hang it! I can't make a statue,"

or shall we set to work with a will, and endeavour to learn how to make one? I believe that what is really required in order to arrive at this desirable consummation is, that the popular eye should be cultivated,—that it should be habituated to the view of the truly noble and beautiful in art, whether through the medium of pictures, casts, or models. The little that has hitherto been attempted in this direction has failed for want of space and arrangement. Year after year has passed on since the absolute unfitness of the building erected to contain the National Picture Gallery has been acknowledged, and the total failure of space in the British Museum is no new discovery. During these years there has been much talk of removing one or both of those establishments to some new situation, in which present wants could be supplied, and space afforded for growth; but one great difficulty has always stood in the way of anything being done,—authorities differed with regard to the locality to be fixed upon. Objections of every conceivable kind were brought against the various spots proposed for the new building. One was too low, another too dear, a third too damp, a fourth too much exposed to smoke,—in short, nothing would do but that which could not be obtained; and, in the meantime, the ever overflowing metropolis has continued to advance in its unchanging westerly course, and acre after acre of ground that might have answered the purpose very well, has been engulphed in the ocean of bricks.

As long as the question of site remained undetermined, there was no prospect of any further steps being taken; no one could even form an idea of what description of building would be required, until it should be known where it was to be built. "Le premier pas" was the grand difficulty, and this the Royal Commissioners appear to have solved; they have cut the Gordian knot. Here is the ground. What shall we build? is now the question for the country to decide.

Had the land purchased been destined solely for the erection of a new National Gallery, or for the reception of the surplus of the British Museum, great as, I believe, would have been the national importance of the measure, it would undoubtedly have been open to the objection of not practically carrying out all the objects of the Great Exhibition; but this portion of the scheme must be considered as being subsidiary to the Industrial College and the Trade Museum; the latter of which will probably, if carried out in the spirit in which it has been commenced, prove to be the most thoroughly practical and genuine supplement to the Great Exhibition that could have been devised. Even this, however, to whatever perfection it may be brought, cannot by itself fulfil all the ends for which its famous predecessor was designed. In that noble collection, every department, not only of industry, but also of science and the fine arts, was represented, with the single exception of painting, which was excluded for reasons inapplicable to a permanent institution; and I think that, in order to carry out effectually the objects of the Great Exhibition, all these departments should be united without any exception,—an undertaking evidently requiring an expenditure which the surplus would be very far from covering.

With reference to the juxtaposition of the learned societies, but little need be said here: the advantages or disadvantages of the measure will have to be considered by each separately, and if any one of them prefers the shade of "its own fig-tree" to the comparative sunshine of a "Cabbage-garden," I do not suppose that any attempt will be made to transplant it by force. At the same time, when we remember that some four or five of the societies (and some of these not the least important among them) live at present, if not in harmony, at least without breach of the public peace, under a common roof provided for them by Government, it seems unlikely that the suggested migration would produce such a lamentable effect upon their temper as Δ appears to anticipate.

We come now to the question whether or not the locality selected by the Royal Commissioners is the best that could have been obtained. I think it is. The incessant change of the metropolis, although brought forward by Δ as an objection, is, to my mind, the strongest point in its favour. So far from there being any probability of Kensington becoming twenty years hence the most inaccessible part of town, there appears to me to be every reason to anticipate the very reverse. The rapid increase of London to the westward, unless checked by some cause beyond the reach of human foresight, must tend each year to make that a spot more and more central; and as a natural result, greatly to increase the pecuniary value of the property. It is doubtless true, that Kensington is further from the "cheap suburbs" than Somerset House, or Marlborough House, but I believe it would be found difficult to purchase land in the neighbourhood of either of those localities on any terms, and in any case it must be done at a price which would preclude the possibility of obtaining sufficient space for carrying out the scheme put forth in the Report. It is hardly possible to imagine any circumstances (short of a successful inroad by our friends over the water, or a wholesale migration of the English race to the antipodes), under which the value of the land purchased by the Royal Commissioners can fail to increase, and that rapidly; indeed I believe that it might be resold, even now, for at least as much as it cost, and a few years hence, for much more. If this be the case, as I doubt not it is, there is no occasion for Δ to mourn as one without hope over the disappearance of the surplus, which, although it be at present sunk, may yet, should the country decide against the scheme of the Royal Commissioners, be exhumed, perhaps larger and more flourishing than before. But I hope for better things. I believe in the practicability of establishing an Industrial University: I believe in its usefulness when established, especially if it be connected with museums of Art, Science, Industry, and Commerce; and I believe that if this great undertaking be carried out with spirit and energy, and be well supported by the country, we need not despair of seeing the despised cabbage-garden transformed into an inexhaustible gold-field, in which every patient and industrious digger shall reap an ample reward for his labour.

Z.

## PROCEEDINGS OF INSTITUTIONS.

BIRMINGHAM.—One of the most cheering and satisfactory meetings for the advancement of science which has taken place in the Midland Counties, was held in the rooms of the Philosophical Institution, on Monday the 10th inst. The attendance included the leading manufacturers of the town, the principal iron-masters of the neighbourhood, with many of the leading and influential gentlemen of the town and surrounding country. The necessity for some exertion being made towards supplying a superior class of instruction in science and art has long been apparent. The mayor, H. Hawkes, Esq., occupied the chair, and there were present, Lord Lyttleton, the Hon. and Rev. Grantham Yorke, Archdeacon Sandford, Chancellor Law, the Revs. J. C. Millar, S. Gedge, J. A. James, J. B. Marsden, and S. Bache; G. Dawson, Esq., M.A.; H. Luckcock, Esq.; W. Matthews, Esq.; S. Thornton, Esq.; J. T. Lawrence, Esq.; J. T. Chance, Esq.; J. F. Winfield, Esq.; Messrs. Arthur Aitken, Oxley, and a number of other gentlemen. The Mayor briefly explained the cause of the meeting, and alluded to the importance of a Literary and Scientific Institution to the town and district. The Report, prepared by the provisional committee, was then read by Mr. W. P. Marshall, of which the following is a digest:—"It is intended that the society shall organize measures for securing the erection, by subscription, of a spacious building. In this it is proposed to provide a lecture theatre, with seats only on the floor in the first instance, but capable of admitting of the construction of a gallery, should such an addition, at any subsequent period, be found necessary or desirable. The plan will likewise embrace three museums, the first of which will be devoted to the raw materials of the industry of this district, geological and mineralogical specimens, &c.; the second to articles illustrative of manufacturing processes, as well as to finished specimens of different dates and countries; and the third to machinery and models. The other features of the scheme comprise a chemical laboratory for lectures and classes; class-rooms; a reading-room, with a scientific and general library of reference; and as an entrance to all the departments a large hall, adapted for the reception of sculpture or other works of art, of which it is hoped that, in a neighbourhood so richly stored with them as our own undoubtedly is, donations would be made sufficiently numerous to form hereafter a nucleus of a public gallery. Another department will be devoted to mining records, showing the dimensions and position of strata in the different mineral workings of the district. This portion of the undertaking will be in connection with the National School of Mines and Museum of Practical Geology, in London, from which every requisite assistance has been promised. The information thus attainable will, it is almost unnecessary to remark, be of the highest value and importance in various ways, and especially in diminishing the number of those terrible accidents from abandoned workings, which can only be provided against by such means."

Lord LYTTLETON, in proposing the first resolution, said, that any doubts as to the utility of such institutions had long since passed away, and the necessity for furnishing industrial education to skilled mechanics had been admitted by the Commissioners of the Great Exhibition, in the Central Institution which was figured forth in their report. Opposition had been raised to Mechanics' Institutions in bygone days, because in giving elementary education it at times involved moral training and coercive discipline. In the present instance it was proposed to deal only with the unemployed time of adults, which had no connection with the above difficulty, and he trusted that the spread of elementary schools would render elementary instruction less requisite in adult institutions. He thought that the Committee would do well not to wait until the whole amount required (20,000*l.*) had been realised, for he doubted not but that eventually the design would be carried out in all its entirety. He hoped the School of Design would find a resting-place within the walls of the institution, and the building now occupied by it, revert to its original purpose. His Lordship concluded by moving the following resolution:—"That in the opinion of this meeting it is highly important to the welfare of this town and neighbourhood to establish in Birmingham a Scientific and Literary Society upon a comprehensive plan, having for its object the diffusion and advancement of Science, Literature, and the Arts, in this important community, upon the principles set forth in the report now read."

The Rev. SIDNEY GEDGE, in seconding the above resolution, spoke at great length on the importance of the movement. He believed that the days of prejudice and ignorance were gone, and men of all sects of religion, and shades of politics, could meet together on the common ground of science.

H. LUCKCOCK, Esq., in proposing the second resolution—"That a subscription list be immediately opened for the purpose of carrying the proposed institution into effect," made a few pertinent remarks, and observed that he thought the Town Council should be applied to, to aid the movement, either by the erection of buildings or otherwise.

Mr. A. RYLAND explained the peculiarity which would result from the adoption of the rate or Museums Act. It had been lost in the spring of last year, and was now difficult of adoption, owing to the necessity for two-thirds of the voters being in favour of it before it could be acted upon. Mr. Ryland explained that it was intended to start the proposed institution by subscription, but in order to obtain any benefit, an additional annual sum would be required, as the original Philosophical Institution had failed from the privileges granted to donors, their heirs, and successors.

The Rev. J. A. JAMES considered this meeting was alike a shame and a glory to Birmingham. It disclosed the failure of one institution, but gave indication that, phœnix like, a nobler one would rise out of its ashes. It was disgraceful to think that the town where Priestly had lectured, and Watt spent the greater part of his useful life, should for many years past have had no institution to improve and secure the perpetuity of her manufactures.

In proposing the third resolution, which was as follows:—"That a committee composed of the several gentlemen whose names were appended to the requisition, be appointed to solicit subscriptions, and to give effect to the resolution just carried," W. MATTHEWS, Esq. remarked, that the rage for emigration and gold seeking had, he at one time feared, diverted men's minds from science. He had, however, hopes that in the end a reaction would come, and the result would be that some of the products of the Australian mines would aid in the dissemination of the seeds of knowledge.

Capt. TYNDALL in proposing the fourth resolution, "That if the committee shall find that the sum named in the report cannot be forthwith obtained, they may be empowered to apply the donations which shall be received, provided they shall amount to 4000*l.*, to the establishment of a smaller institution upon the principles of the report, to be extended as further sums shall be received," remarked, that the alternative of starting the lesser institution would, he hoped, not be necessary, as he trusted that the liberality of his townsmen would avert what he should consider as something akin to a reproach.

Cleckheaton.—On the evening of Tuesday, the 28th ult., the Rev. R. Cuthbertson delivered the concluding Lecture of his course, "On Health and Sanitary Reform." The lecture embraced the remedies for the removal of the predisposing causes of fever and other diseases, viz., an abundant supply of pure water, a complete system of sewerage and drainage, the paving and cleansing of streets, due attention to the ventilation and cleansing of dwelling-houses, lodging-houses, &c. The objection to sanitary measures on the ground of expense was considered, and facts were adduced to prove that a judicious expenditure for that purpose will issue in a saving, even in a pecuniary point of view. In conclusion, a summary was given of the suggestions which had been made in the course of the lectures, for promoting the sanitary improvement of the town.

Edinburgh.—On Friday evening last, Dr. Vaughan of Manchester delivered his Second Lecture, at the Philosophical Institution, on "The History of the Early Asiatic Nations." After showing that the credit of priority in the discovery of Assyrian antiquities was due to M. Botta of Paris, (though he was preceded so far by Mr. Rich, who, when British Resident at Bagdad, on a visit to Mossul long before M. Botta's residence in Mossul, foresaw what a vast field of antiquarian wealth was hid under the surface in that district,) Dr. Vaughan proceeded to detail the difficulties which Dr. Layard had to encounter. He contrasted, in severe style, the promptness and liberality with which the French Government assisted M. Botta, with the dilatoriness of the British Government in aiding Dr. Layard; stating that it was due to Sir S. Canning that the Assyrian antiquities now in the British Museum were not in Paris. The Doctor next proceeded to explain how modern scientific men had been enabled to decypher the arrow-headed characters of the ancient Assyrian language. This, he showed, was by the marble slabs having, in some instances, underneath the arrow-headed characters, the same sentences in the ancient Persian language. After describing Assyria in its highest condition of civilization and prosperity, Dr. Vaughan concluded his eloquent and most interesting lecture by quoting from Isaiah the sublime passages predicting the miserable destruction and desolation of Babylon.

St. Leonard's-on-Sea.—The Committee of the Mechanics' Institution have been engaged during the past week, in arranging the preliminaries for holding a *conversazione* and exhibition, at the Assembly-rooms, on the 24th instant, and following days. It is intended to comprise works of art, articles of *vertu*, models of inventions, autographs, MSS., oil paintings, water-colour drawings, photographs, coins, medals, specimens of tapestry and curious needlework, specimens of modelling, carving, and sculpture; geological and archæological collections, specimens of natural history, &c. The Committee at the outset aimed at a very modest work, but having received considerable support and patronage from the influential persons in the neighbourhood, a new impetus has been given to their exertions, and they are now preparing to deal with an affair both of magnitude and interest.

Stoke-upon-Trent.—On Thursday evening, the 30th ult., the members of the Athenæum held their sixth annual conversazione, in the New Town-hall. The Hon. W. F. Cowper, M.P., who presided, said:—"He believed public feeling generally in this country was becoming more favourable to institutions of that description; and it was agreeable to reflect on the change which had manifested itself in this respect in the public mind. A hundred years ago, when Johnson lived, the majority of the educated classes considered it not only inexpedient, but unnecessary, that the working population should receive any education at all. It was admitted, at the period he alluded to, that it was all very well to teach the young to read and write, but it was only of late years that the importance of cultivating and encouraging a taste for literature and science by means of institutions like that had been recognised. He believed that feeling arose from the same conviction which prompted a very eminent writer to observe that, "whatever abstracts our thoughts from the gratification of the senses, and teaches us to look within ourselves for happiness, tends to advance the dignity of our nature." That Institution was one of the means of promoting the spread of literature; and those who had the direction of it had exercised a wise discretion in not excluding from the library what was known as light literature, for such reading was calculated, at least, to amuse the mind, though the members should prefer the study of improving books to the light literature which was included in the library. Comparing our position in point of education with that of other countries, like France or Germany, he regretted to say we, at present, stood somewhat inferior to them; for, amongst the population of both those nations, the proportion of those who could not read and write was much less than in England."

Tenterden.—The *soirée* of the members of the Mutual Improvement Society was held in the Town-hall, on Tuesday, the 4th instant. W. Grisbrook, Esq., the President, occupied the chair. About 160 persons were present. They all seemed much delighted with the amusement offered them, as well as edified with the sentiments proposed in several able speeches, which were delivered at intervals during the evening.

Thirsk.—On Tuesday, the 4th inst., the members of the Mechanics' Institution held their Annual Meeting. The Vice-president, J. Rider, Esq., took the chair shortly after six o'clock; when, after some preliminary matters had been attended to, he called upon M. M. Milburn, Esq., the Secretary, to read the report, from which we extract the following: "From what has been stated, it will be seen that the funds of the institution have nearly doubled since 1848, at which period it seemed to be nearly stationary. The number of members is 106, and the income of the Society for the year ending Jan. 4, 1853, including subscriptions due, is 64*l.* 10*s.* 11*d.* The issue of books is 2,095. The Committee have to congratulate the members on their having with some difficulty, and against considerable competition, obtained a promise of the meeting of the Yorkshire Union of Mechanics' Institutes during the summer of the present year, and the Committee feel it their duty to recommend that the energies of all the members should be employed to give as friendly and hospitable a reception to the delegates as possible." The following are the officers for the year:—President, Sir W. P. Galway, M.P.; Vice-president, J. Rider, Esq.; Treasurer, W. Sinclair, Esq.; Secretary, M. M. Milburn, Esq.; Librarians, Mr. W. Bransby, and Mr. Thomas Scott; Committee, G. Kitchingman, Esq., Messrs. G. Rhodes, G. Whitwell, H. Masterman, jun., G. Lancaster, G. Nicholson, and P. Elgie, of the first and second classes; and Messrs. J. Faulkner, G. Richardson, J. Addison, H. Heworth, and G. Nicholson of the third. Votes of thanks to the officers for the past year were cheerfully carried by acclamation.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

C. B. (will find an answer to his query in No. 5, page 58); P. H. D. (too late).

⁂ The article on Enamels, though in type, cannot appear this week, owing to want of space.

### QUESTIONS FROM CORRESPONDENTS.

*Photographic Apparatus.*—Can any of your readers inform me where I can find a description of a new Photographic Apparatus, called an "accelerator," said to have been invented by a Mr. Beauford, and whether its reported performances can be verified? (No. 23.)

*Steam.*—Is there any good account yet published of the direct application of steam to manufacturing processes? (No. 24.)

*Nails.*—What description of machinery is used in America for forging nails, in place of manual labour? (No. 25.)

### ANSWERS TO CORRESPONDENTS.

*Glass Engraving.*—(No. 9.) Enclosed are two specimens of Glass Engraving (Glas-druck) which were given to me by Dr. Bromeis, of Hanau. The nature of the material allows of very fine engraving, and there are parts of the specimens which give reason to believe that it may attain the very highest point of refinement. I understood from Dr. Bromeis that he expected it to be done in England, but the time is now so long gone by, that it would be better if a new impulse were given to it. R. A. S.

⁂ The specimens exhibit great control over the medium employed, and the capability of producing a good artistic effect, as well as a minuteness of touch hitherto unattained, it is believed, by any previous process. The specimens may be seen on application at the Society's House.

*Shop Lamps.*—(No. 19.) As it cannot matter much whether an obstruction be caused by wood, iron, or glass, there can be little doubt that the Act that was passed for the removal of the tradesmen's signs, &c. (6th Geo. III. c. 26, s. 17) which has not been repealed, could be made use of to remove the existing great nuisance of the tradesmen's lamps. In vol. 3 of "Notes and Queries," page 285, full particulars will be found as to this Act. W. A.

*Omnibuses*—(No. 18.) It is said that the reason why omnibuses cannot be made wider and higher than at present is owing, in the one case, to the fact that they would not then be able to traverse the narrow thoroughfares, which they are frequently required to do when the broader ones are blocked up; and, in the other case, that the height of the entrances to the stables is so limited, in many instances, that loftier omnibuses could not enter. Larger omnibuses have been made, and used, but their extension has been prevented by these causes. Might not smaller omnibuses, drawn by one horse, and to carry, say, six persons, be introduced with advantage? The fare would, perhaps, need to be higher than at present; but if the thing was well done, this could scarcely be an objection. G. N. H.

## MISCELLANEA.

Cotton in Martinique.—The Governor of Martinique, it appears, has taken the initiative in certain experiments that are to be made, with a view of forwarding this new culture. We find it stated that the French Consul at New Orleans has been instructed to send to Martinique a quantity of this cotton-seed, sufficient to plant about two hectares of land; and information has been formally asked at the same time as to the quality of soil best adapted to the plant, as well as the manner in which it should be laid out, and the most approved methods established by practice for the sowing, culture, and gathering, of the herbaceous cotton. A planter at Fort-de-France, having obtained some seed from M. Bouvier, of Guadaloupe, a trial of it is forthwith to be made at the Jardin-des-Plantes of St. Pierre, and upon lands near Fort-de-France.

Mine Ventilation.—A petition to Parliament from the coal-miners of Northumberland and Durham is being numerously signed. The petition sets forth the necessity of legislative interference to enforce a better ventilation of mines, and greater precautions against explosions; and prays for an increased number of inspectors, that there may be a closer supervision of mines; for an examination into the fitness of officers and managers of mines, on whom life depends, as in the case of masters and mates of ships; for a six hours' bill for boys under fourteen; for a special coroner to investigate fatal mining accidents; and for penalties in cases of proved negligence.

Cheap Portable Camera.—A correspondent suggests the introduction of cheap and small cameras capable of being used by the junior members of Literary and Scientific Institutions, and that a Manual of Elementary Instruction to teach them the mode of procedure is a desideratum. The Society's Premium List has already directed attention to this question.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 7th Jan.,* 1853.

*Dated 21st Dec.,* 1852.

1117. R. Powell—Coats and outer garments.
1119. J. B. Moinier and C. C. Boutigny—Concentrating syrups and distillation.
1121. G. Beadon, Commander, R.N.—Constructing and propelling ships.
1123. W. De la Rue—Surfaces of paper and card-board.
1125. E. D. Moore—Preparation of malt and hops.
1127. J. Roydes—Machinery for drawing cotton, &c.

*Dated 22nd Dec.*

1129. C. Denis veuve Quinchez—Fabric for making mantles, bonnets, &c.
1131. J. Roberts—Apparatus for preserving animal and vegetable matters, and for cooling wines, &c.
1133. J. H. Johnson—Machinery for forging iron and other metals. (A communication.)
1135. W. Aspdin—Manufacture of Portland and other cements.
1137. P. Aychbourn—Rendering materials impervious to air or water.
1139. J. Livesey—Lace machinery and piled fabrics.

*Dated 23rd Dec.*

1141. A. J. Hobson—Metallic bedstead.
1142. J. W. Couchman—Fastening window-sashes.
1143. A. Deutsch—Treating oil of colza, &c.
1144. C. Binks—Composition of paints.
1145. W. Westley and R. Bayliss—Fastener applicable to window-sashes, tables, &c.
1146. N. Malinau—Stopping and covering bottles, &c., and machinery for same.
1147. G. Gwynne and G. F. Wilson—Treating fatty and oily matters.
1148. W. Roper—Shaping and ornamenting sheet-metal.
1149. J. L. David—Manufacture of woollen fabrics.
1150. P. Fairbairn and S. R. Mathers—Machinery for carding.
1151. J. Davis—Brick and tile-machine.

*Dated 24th Dec.*

1152. P. Peyre and M. Dolques—Machinery for dressing woollen cloth.
1153. J. Hinks and G. Wells—Penholder.
1154. J. L. Murphy—Drawing off liquids,

1155. J. Burch—Machinery for reaping, loading, stacking, and storing grain, &c.
1156. J. Burch—Machinery for threshing, winnowing, cleaning, and sorting grain, &c.
1157. J. Burch—Passenger and other carriages.
1158. W. Ramsell—Generating steam and hot air, together or separately.
1159. R. Griffiths—Motion to drills.
1160. G. Michiels—Manufacture of gas.
1161. G. Bower—Manufacture of gas.
1162. J. G. Wilson—Construction of carriages for railroad and other roads, &c.
1163. A. V. Newton—Motive power. (A communication.)
1164. R. Lublinski—Joint for umbrella and parasol sticks.
1165. W. Tuer, W. Hodgson, and R. Hall—Textile fabrics and machinery for the same.
1166. P. C. Nesmond—Machinery for manufacture of ice, &c.

*Dated 27th Dec.*

1167. J. Anderson—Heating and ventilating and remedying smoky chimneys.
1168. G. Ingham—Machinery for drawing cotton, &c.
1169. Rev. J. F. Gordon—Facilitating the turning of four-wheeled carriages.
1170. G. F. Wilson—Treating certain fatty bodies.
1171. G. Gwynne and G. F. Wilson—Treating fatty and oily matters.

*Dated 28th Dec.*

1172. J. Mason—Machinery for preparing cotton, &c., for spinning.
1173. J. Darling and H. Spencer—Machinery for spinning cotton, &c.
1174. W. B. Johnson—Steam-boilers and apparatus.
1175. P. T. Giraud—Apparatus to fix bonnets on the head.
1176. J. Gidman—A skate.
1177. E. Mucklow—Retorts for distillation of pyroligneous acid, &c.
1178. E. Mucklow—Machinery for cutting and rasping dye-woods.
1179. E. Mucklow—Preventing radiation of heat from steam-boilers, and effects of incrustation.
1180. W. Busfield—Combing wool, &c.
1181. A. Bernard and A. Koch—Machinery for preparing flax-straw, flax, &c.
1182. J. Webster—Manufacture of springs.
1183. C. J. E. Junot—Reducing metallic substances, and plating by means of electricity. (A communication.)
1184. S. Clegg—Measuring gas.

*Dated 29th Dec.*

1186. J. Copling—Safeguard railway signal.
1187. H. Kibble—Travellers' monitor, or ticket and parcel protector.
1188. J. Whichcord and S. E. Rosser—Burning and applying gas for light and heat.
1189. B. Glorney—Motive power.
1190. S. J. Pittar—Goloshes for boots and shoes.
1191. W. E. Newton—Manufacture of carpets. (A communication.)
1192. A. D. Brown—Portable articles of furniture.
1193. W. Brown—Forging, shaping, and crushing iron, &c., applicable to obtaining and applying motive power.
1194. J. E. Cook—Composition for prevention of decay and fouling ships' bottoms and other exposed surfaces.
1195. J. W. Friend—Measuring and registering distance run by ships and boats through water.
1196. J. Power—Silvering metals and glass.
1197. A. E. L. Bellford — Quartz-crushing machinery and amalgamating same, applicable to all kinds of ores.
1198. A. E. L. Bellford—New mode of advertising.

*Dated 30th Dec.*

1199. T. Walker—Regulating speed of steam-engines.
1200. T. Walker—Regulating dampers of steam-boilers and evaporating furnaces, applicable to indication of pressure of steam, &c.
1201. H. Hutchinson—Machines for washing bottles.
1202. J. Ward and W. Burman—Brick and tile-machinery.
1203. R. S. Oliver—Waterproof and other garments.
1204. J. Singer—Wearing apparel.
1205. W. E. Newton—Attaching metals to metals.
1206. R. Taylerson—Ship-building.

*Dated 31st Dec.*

1208. W. M. Pickslay—Blast furnaces, called "calorific blast."
1210. D. Dixon—Apparatus for retarding and stopping locomotive engines, &c.

*From Gazette, 11th Jan., 1853.*

NONE.

## WEEKLY LIST OF PATENTS SEALED.

*Dated 8th Jan., 1853.*

1. Robert Adams, King William-street, City—Improvements in ball-cartridges.
2. George Henry Brockbank, Crawley-street, Oakley-square improvements in upright pianofortes.
4. James Hodgson, Liverpool—Improvements in constructing iron ships and vessels.
5. Joshua Smith, Sheffield—Improvements in table-knives.
6. Moses Poole, Serle-street—Improvements in the manufacture of guns and pistols.
9. George Green, Mile-end Road—Improvements in the manufacture of casks.
13. Edward Lambart Hayward, Blackfriars-road—Improvements in lock-spindles.
14. Thomas Christy, jun., Gracechurch-street—Improvements in weaving hat, plush, and other piled fabrics.
16. Moses Poole, Serle-street—Improvements in the manufacture of telescope and other tubes.
19. Moses Poole, Serle-street—Improvements in moulding articles, when India-rubber combined with other materials are employed.
21. George Duncan and Arthur Hutton, Chelsea—Improvements in the manufacture of casks.
24. Moses Poole, Serle-street — Improvements in making covers for, and in binding, books and portfolios, and in making frames for pictures and glasses.
28. Moses Poole, Serle-street—Improvements in coating metal and other substances with a material not hitherto used for such purposes.
29. John Daniel Ebingre, Brussels—Improvements in the manufacture of animal charcoal.
30. Moses Poole, Serle-street—Improvements in the manufacture of trunks, cartouch, and other boxes, in knapsacks, pistol-holsters, dressing, writing, and other cases, and swords and other sheaths.
32. William Pym Flynn, 18, Rutland-place, Cork—Improvements in paddle-wheels.
33. Moses Poole, Serle-street—Improvements in the manufacture of pails, tubs, baths, buckets, measures, drinking and other vessels, basins, pitchers, and jugs, by the application of a material not hitherto used in such manufactures.
37. Moses Poole, Serle-street—Improvements in covering and sheathing surfaces with a material not hitherto used for such purpose.
43. Moses Poole, Serle-street—Improvements in harness and in horse and carriage-furniture.
120. George Collier, Halifax, Yorkshire—Improvements in the manufacture of carpets and other fabrics.
121. John Lee Stevens, Kennington—Improvements in furnaces.
123. Richard Whytock, Greenpark, Zibberton, Mid-Lothian—Improvements in the manufacture of fringes, and of plat for these and other ornamental works.
136. William George Nixey, Moor-street—Improvements in tills and other receptacles for money.
162. John Ignatius Fuchs, Zerbst, Anhalt Dessau—An electro-magnetic apparatus.
165. Moses Poole, Serle-street—Improvements in constructing bridges, viaducts, and such like structures.
230. James Bullough, David Whittaker, and John Walmesley, Blackburn—Improvements in sizing-machines.
246. George Hallen Cottam, Charles-street, Hampstead-road—Improvements in chairs, sofas, and bedsteads.
273. John Frederick Chatwin, Birmingham—Improvements in the manufacture of brushes.
274. John Frederick Chatwin, Birmingham—Improvements in the manufacture of buttons
315. Alexander Clark and Patrick Clark, Gate-street, Lincoln's-inn Fields—Improvements in the manufacture of shutters, doors, and windows.
624. Edward Lord, Tormorden, Yorkshire—Improvements in certain machinery to be used in preparing, spinning, and weaving cotton and other fibrous substances.
659. John, Edward, and Charles Gosnell, 12, Three King-court, Lombard-street, City—Improvements in brushes.
674. Peter Fairbairn, Leeds—Improvements in the ordinary screw-gill machinery, when applied to the purposes of drawing, combing, and heckling fibrous materials.
776. Francis Bresson, 4, South-street, Finsbury — Improved mode of propelling on land and water.

Sealed under the old law:—

Thomas Fildes Cocker, Sheffield, Yorkshire—Improvements in annealing or softening metallic wires and sheets of metal; also in reducing, compressing, or drawing metallic wires; also in the manufacture of metal rolls.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Jan. 7 | 3408 | Ventilating Waterproof Garment. | James Thomas Hewes | Vernon-villa, Woolston-lawn, Southampton. |
| „ 11 | 3409 | A Stay and Dress-fastening. | Caleb Hill | Cheddar, Somersetshire. |

# SOCIETY OF ARTS.

**FRIDAY, JANUARY 21st, 1853.**

## SEVENTH ORDINARY MEETING,

### *Wednesday, January 19th*, 1853.

The Seventh Ordinary Meeting of the Society was held on Wednesday, the 19th inst., Henry Thomas Hope, Esq., Vice-President, in the Chair.

The following were elected Members :

Boosey, Samuel, 7, Nutford-place, Edgeware-road
Goodeve, Thomas Minchin, King's College
Hunter, George Yeates, Cecil-square, Margate
Scamell, George, Melrose-lodge, Holloway
Walters, Frederick, 16, Moorgate-street,

and the names of eleven candidates for membership were read.

The Secretary drew attention to some fine specimens of native borate of lime from South America, exhibited by Mr. Bollaert.

A paper was read by A. Claudet, Esq., on "The Stereoscope and its Photographic Applications."

M. Claudet, after having given a brief history of the splendid discovery of Professor Wheatstone, of the principles of binocular vision, and described his instrument called the Stereoscope, by which he has illustrated various curious phenomena of vision ; stated that Sir David Brewster, in a paper read before the British Association at Birmingham in 1849, on various phenomena of binocular vision, brought forward a Stereoscope based on the principle of the refracting Stereoscope of Professor Wheatstone, particularly adapted to the inspection of daguerrotype pictures, and formed of two semi-lenses, which Sir David Brewster called the Lenticular Stereoscope. Some time after, Sir David Brewster, being in Paris, had occasion to give the description of this instrument to M. Duboscq Soleil, an optician of that city ; who, struck with the advantages of applying the Stereoscope to photographic pictures, had the enterprise to construct a number of these instruments for that purpose. In the beginning of 1851, some were exhibited at one of the *soirées* of Lord Rosse, with daguerrotype pictures, and the effect produced a considerable interest. From that moment the attention of English photographers was awakened, and M. Claudet immediately began to execute daguerrotype pictures and portraits for the Stereoscope. This new art excited very great interest in the scientific and artistic world—and stereoscopic portraits and other pictures being now so universally known, the time has come when it is necessary to explain how flat pictures could give the illusion of real models, with all the effect of relief and distance.

Having given a description of the human eye, which is a hollow sphere, having at one pole the pupil, and at the other the optical nerve, conveying the sensations to the brain, and the remaining part of the interior being called the retina, and receiving the impression of all objects viewed by the pupil—the various pencils from all parts of the object viewed coming to a point in the pupil—crossing each other, and therefore being imprinted upside down on the retina, he began by showing that the principal sensations of vision are the result of habit ; and that these sensations may be varied by many changes in the ways of their perception.

Single vision by means of two eyes is due to the property by which similar parts of the two retinæ unite to produce on the mind a single impression of the same image. Supposing that the two retinæ were like two spheres, having for their axes the optical axes,—and that from the point in the centre of each retina the two spheres were divided in degrees of latitude and longitude, each point of the two retinæ, at the crossing of the same degrees of longitude and latitude have the same sensation, that when the images of objects, by the proper convergence of the optical axes, are falling on the same parts of the two retinæ, a single vision is obtained for all objects situated at the same distance before the eyes in a circle called the horopter. The two lines of objects beyond and within this circle, forming with the two eyes an angle different to the angle by which the two visual axes would coincide with the centre of the two retinæ, in that angle they do not coincide with the axes of the supposed divided spheres—one falls on the left of the centre of the left retina, and the other on the right retina, therefore they fall on two different degrees of longitude and latitude, and consequently on parts of the retina, which coming on the sensorium of vision, produces a different sensation and two different images.

The brain is never sensible of perceiving an object single, unless the axes of the eyes are directed on that object, when the image is imprinted on each of the retinæ exactly opposite the pupil, all other objects appearing double—the far objects being imprinted on the inner parts of the retinæ, or the parts nearer the nose, and the near objects on the opposite sides.

We are enabled to judge of the distance of objects one from another, by the angle which the two pencils of light reflected from the two objects, make at the pupil, where they converge ; the larger this angle is, the larger is the vertical angle on the other side of the pupil, or within the eye, and consequently the farther apart on the retinæ are the points at which the two pencils strike it, and therefore the idea of distance of the objects one from another.

In looking at a solid, having height, breadth, and length, the different points in the line of projection corresponding with the breadth, are situated at different distances from the eyes, and therefore an angle of convergence which cause the nearest point to fall in the direction of the axes of the supposed spheres makes the farther point fall out of that direction ; where the nearest point produces single vision, the farthest point produces double vision. In order to see the farthest point single, the optical axes are to converge on that point, and then the nearest appears double. The sensation arising from that alteration of convergence is one of the causes giving an idea of distance. When the angle of convergence is greater, we are accustomed to judge that the object is nearer, and when the convergence is less, we conclude that the object is farther.

The double image of nearer objects than the one giving single vision, are represented, one on the left eye, on the left of the axis of the supposed sphere, and the other on the right eye on the right of that axis.

The reverse is produced in the order of the double images for farther objects. From the sensation of these double images on each opposite side of the two retinæ, we have the idea of farther or nearer objects.

When we look with two eyes at a solid, some parts of this solid, visible to one eye, are invisible to the other; we have two different sensations at once, and from these sensations we judge by habit that the object we look at is a solid.

When we look with two eyes at a wall, before which there is a lamp-post, the lamp-post hides no part of the wall, because the part hidden to the right eye is visible to the left, and the part hidden to the left is visible to the right. On shutting one eye there is a part of the wall behind the lamp-post which we cannot see. With two eyes, by the degree of separation of the images of the lamp-post, we judge of its distance from the wall; with one eye we have only one image of the lamp-post, covering entirely one part of the wall, and we cannot judge how far it is from the wall,—it appears stuck against it.

If we hold the end of a stick before us, with one eye we shall find some difficulty in knowing how much we must extend the arm in order to touch the stick with one finger,—we shall hesitate a few instants until we can find the exact distance; but with two eyes we can at once, and with the greatest precision and rapidity, touch the end of the stick. Therefore double vision gives the idea of distance.

In order to obtain a single vision of an object with two eyes, we are obliged, in order to obtain the coalescence of the two images on the similar parts of the retina, to direct the axes of the eyes upon that point. The objects before and behind appear double because, by the convergence of the optical axes for these objects, the optical axes do not coincide with the axes of the supposed spheres, and the various parts of the images of those near and far objects fall on dissimilar parts of the two retinæ.

If we place one finger at a short distance before the eyes, and another a little farther, and direct our vision upon the first, it will be seen single while the second will appear double; but if our attention is directed upon the second, then the second will be seen single, and the first double.

In the first case the double image of the right eye will appear on the right of the single image, and the double image of the left eye on the left; but in the second case the double image of the right eye will appear on the left of the single image, and the double image of the left eye on the right.

From the planes of the separation of the double images before or behind the object we look at, we judge by habit that the double objects are nearer or farther. If we increase or diminish by artificial means, such as by squinting inward, or by the Stereoscope, the separation of the double images, we conclude that they are at the distance they would be in natural vision.

If we invert the planes, where, for nearer and farther objects, the double images would be by natural vision, showing on the right what is to be on the left, and *vice versâ*, as we can do by the Pseudoscope, or by squinting outwards, we have the illusion of near objects appearing far and far objects appearing near.

Binocular vision gives an idea of form, solidity and distance, because the perspective projection of the two eyes are different; and when these two different images, by the proper convergence of the optical axes, coincide on similar parts of the two retinæ, we have the sensation of only one image, but only for one distance; the objects nearer and farther are seen double; and from their duplicity, and their separation on the right or on the left, we judge of the other distances before or behind.

It is very difficult to convince some persons that they see all objects double, except the one upon which the optical axes are directed. Indeed, it is by no means easy for many people to squint, so as to see the objects double, until they have practised some little time. It is also hard to explain why the sensation of the double objects which are imprinted on the retinæ is not carried to the brain. The only solution that can be given, is, that it is the result of habit, which also gives us the idea of things being of their true shape, and in their proper position, instead of being inverted as they are represented on the retina.

Indeed, in nature there are many examples of sensations which are conveyed to the mind in a contrary manner; or the mind is sensible that the true fact is the reverse of what the senses seem to convey. Thus it is, that in a boat upon a river, the objects on the banks seem to move, because we have no sensation of moving ourselves; but still from habit we are sensible that it is ourselves, and not the objects which are moving. Again, if we cross the first and second finger, and with them so crossed, touch a pea, we have the sensation of touching two peas, because, in the natural order of things, the parts of the fingers which are now touching the pea, could not at the same time touch the same object. Yet we still know that we are touching but one pea. And again, we are accustomed to hear a louder sound when a person is speaking to us in a room, than when the same person is out of the room; but if this person near us utters a sound similar, as much reduced in intensity as the voice of a person out of the room, we have the illusion of the sound coming from the outside.

Photography alone can produce two images perfectly identical to the images on the two retinæ; and if we can place them, so that the right perspective is seen only by the right eye, and the left perspective only by the left eye, we have on each retina the same representation we had from looking at the natural objects.

This is precisely the effect of the Stereoscope; for if we take two views of the same object, one similar to that which would be seen by the right eye alone, and the other similar to that seen by the left eye, then place each picture under each eye, and, by means of two prisms, refract them on the two retinæ in planes where they coalesce; the right picture is refracted towards the left, and the left towards the right, on the middle space between them, and there they coincide, as the two pictures of the natural objects.

But they do not coincide in all their parts, any more than the natural images for their various planes; and, as in natural vision, we are obliged, in surveying the stereoscopic pictures, to alter the convergence of the optical axes, according to the various places they represent. The act of altering the convergence for the various planes, gives the sensation of distance of these planes; and during that convergence, the objects nearer or behind are felt double on the two retinæ; the double images on the right of one eye, and on the left of the other, indicate near distances; and on the left or right, indicate far distances. Therefore, in the Stereoscope we have the same sensation of solidity and distance as we have with two eyes.

If the perspective projections of the daguerrotype images are taken at a greater angle than they are with the eyes for the same apparent size, the optical axes have to alter their convergences in a greater ratio in passing from one point to another; the double images within and beyond the point of vision are more separated than in the natural vision; and from these two exaggerated effects, we conclude or feel that the objects are more separated than they are in nature, and that the distance or relief is greater.

By magnifying more or less the stereoscopic pictures, we, by the same reason, increase, less or more, the stereoscopic effect.

This is exemplified by looking with a double opera-glass: if we look through the large lens near the eye, we decrease considerably the sizes of objects; and as the angle of vision remains the same as for natural vision, it is too large for the perspective projection of the objects; for this reason the distances between the various planes appear exaggerated, and the objects more in relief than they really are,—because the eyes have to alter more their convergence, in surveying the various planes, than they would have to do, if the objects were really at the distance at which they appear to be.

In looking through the eye-pieces of the same opera-glass, we have a contrary effect, and a very unpleasant one, as we magnify the pictures. If they were seen by the eyes at the distance they appear to be, the angle of the optical axis would be larger than the natural angle; and the exertion in converging from one point to another of the magnified picture is less through the opera-glass than it should be if we were looking at the distance giving the same size of image on the retina. For this reason, double opera-glasses are defective, and produce an incongruous sensation, which is very disagreeable. A single opera-glass is far preferable, and gives the idea of greater distance between the objects, and more relief of their various parts, than a double glass.

These few extracts from the elaborate paper of M. Claudet will suffice to explain the phenomena of the Stereoscope applied to photographic pictures.

One of the most remarkable observations to which he refers is, the singular similarity of effects between squinting outwards and the Stereoscope, and squinting inwards and the Pseudoscope.

By squinting outwards on a stereoscopic slide, we have without the Stereoscope the same effect of relief and distance; and by squinting inwards, the same effect of intaglio and inverted distances we have with the Pseudoscope; and by squinting, *vice versâ*, for both instruments, we have the pseudoscopic effect with the Stereoscope, and the stereoscopic with the Pseudoscope.

It is easier to squint inwards, as we do when looking near our nose; and to obtain the stereoscopic effect in looking at stereoscopic pictures, we must place the right image under the left eye, and the left image under the right eye: in so doing we have the most beautiful effect of relief and distance, and more perfect than with the instrument, because the lenses and prisms cause always a certain amount of distortion from spherical and chromatic aberrations.

M. Claudet illustrated his lecture by a number of excellent diagrams, by which all the various phenomena were fully explained.

He showed that two exactly similar pictures, placed in the Stereoscope, produced less relief than one of these pictures seen alone with one eye, proving that it is from the gradual coalescence of the various planes of binocular pictures that the sensation of relief and distance are obtained; from this fact he proves why paintings can never represent the distances and relief of nature, or stereoscopic vision; that being the representation of only one perspective projection, such as that we have with one eye, paintings should never be inspected except with one eye, the vision with two eyes of a monocular picture giving a sensation of less relief and distance than the vision with one eye. For this reason, he thinks that those double conical tubes used in picture galleries should be discarded, and that a better perception of distance and relief would be obtained in looking through a single tube with one eye.

To illustrate the effect of the stereoscopic vision, and the necessity of altering the convergence of the optical axes for every plane of the double picture, M. Claudet placed, one against another, two photographic engravings taken for the stereoscope, showing that when the lines of the foreground coincide, the lines of the plane behind are double; and that when they coincide for the background, they are double for the foreground; when coinciding for the middle distance, they are double both for the foreground and for the background. So that in surveying the two pictures in the Stereoscope, the eyes have, as it were, to slide from right to left, and from left to right of the two engravings, in order to have a single vision of any point of the picture the observer wants to look at.

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MR. WYNDHAM HARDING remarked, that the subject of binocular vision might, he believed, be easily understood by any person of ordinary capacity. The two eyes received at the same moment different images; yet the mind had the idea of one object only. As an illustration of this, if a small book were held in the hand before the eyes, by closing each eye alternately, the back and the edges only would respectively be seen; whereas, if the book was looked at with both eyes open, the mind at once recognised its complete form and appearance. M. Claudet had correctly stated that objects on a plane, at a given distance from the eyes, were alone clearly and perfectly seen. When two objects were placed in the Stereoscope, the two were put together; and the axes of the eyes converging on them, immediately made out the truth. The Stereoscope, in fact, did only what the eyes did in squinting. All that the eyes saw perfectly and clearly, was at the point where their two axes converged. After they had converged on one object, they were, by the mere act of volition, removed and brought to bear upon another; and although, in the act of shifting them, a series of double images were presented, so admirably were these organs adapted to the wants of man, that in a healthy organ the confusion arising from this was never perceived.

Mr. **ALFRED SMEE** referred to the difficulty experienced by persons who had lost one eye; and to the time which elapsed before they could acquire the facility of correctly measuring distances under such circumstances. That it could be acquired, was shown by the fact that many coachmen and cabmen so afflicted were able to drive through the streets of London with precision and safety. He did not quite agree with M. Claudet in his definition of squinting, which was a term that could only be properly applied to a diseased state of vision. Squinting was not a convergence of the eyes; but consisted in the fact of one eye being directed to one spot, and the other eye to another; in which case, if the vision were perfect, a double image would be presented. We were too much in the habit of looking at objects with one eye; whereas, if we desired to see a beautiful flower or other object in all its perfection of solidity and form, it was necessary to bring both eyes fairly and fully to bear upon it. If this faculty were exercised, even in passing through the streets, the effect would be found to be surprising. Mr. Smee added that it was worthy of notice that only a very small central spot in the retina presented perfect vision. The power of the surface immediately surrounding that spot was less perfect, and the power decreased according to its distance from that point. Here, therefore, was a beautiful provision of Nature; inasmuch as the parts of the retina, which were liable to receive that superposition of objects which M. Claudet had mentioned, and thereby to cause double vision, were less sensible to the minute impressions obtained in the centre of the eye.

M. **CLAUDET** explained a series of diagrams, intended to show the different figures of an object formed by the two eyes. He also said that in making use of the term "Squinting," the idea he wished to convey was simply that of the convergence or divergence of the axes of the eyes.

Mr. **WINKWORTH** proposed, and Mr. **ROGER FENTON** seconded, a vote of thanks to M. Claudet, which was carried unanimously.

## PHOTOGRAPHIC EXHIBITION.

THE great interest which was excited by the Photographic Exhibition has led to its being kept open several weeks longer than was originally intended. Members are reminded that this Exhibition, as well as that of recent patent inventions, will close on the 29th of January.

## EAST INDIAN EXHIBITION.

THE great interest which was excited by the East Indian Department of the Exhibition of 1851, reasonably leads to the expectation that the Indian Department of the Great Dublin Exhibition will form one of the most remarkable and instructive collections of the many which will be brought together; and in this expectation we trust the public will not be disappointed. Independently of the feeling of curiosity and interest which naturally attaches itself to all the productions of oriental ingenuity, investing them, as it were, with a halo of barbaric romance, and filling the mind with visions of the magnificence of the east, there are many other considerations, all tending to render an Indian Exhibition one of peculiar interest; and in truth there is no class of persons, in any rank of life, who would not appreciate such a collection. From the peculiar religion, and from the customs and habits of the nations of India, many traditions and practices have remained unchanged from the most remote ages, and many of the ceremonies and customs which we find described in the early books of Scripture are illustrated and explained by the present ceremonies and customs of the tribes of India. In fact, there is no part of the world so rich in historic evidence and facts, or so instructive to the historian, the ethnologist, or the lover of literature generally. The same causes which have preserved unchanged the peculiar rites of former ages, and resisted the innovating hand of time, have also prevented the improvement of arts and manufactures, and have preserved them to us nearly in the same state as they formerly existed. There is, however, little cause to regret this, for though the arts and manufactures of India may have made little progress for many generations, yet even at the present time their artizans are in many things equal to, and in some few, superior, to those of our own country, with all the advantages of progressive development and scientific skill. Hence the manufacturer has still much to learn from the humble artists of Hindostan, and the artist may study with advantage the beauty of the form and the marvellous combinations of colour which a deep appreciation of the beautiful in nature, and a careful and laborious study of the true principles of harmony, have rendered almost innate to many of the tribes of India.

Again, passing on from these matters, the works in metal and enamel, carvings in ivory, wood, and stone, and fabrics of silk, wool, cotton, and other materials, there are less attractive, but nevertheless most important, and to many deeply interesting subjects for examination in the class of raw produce. Cotton, Silk, Rice, Indigo, Tea, Sugar, and the thousand other natural or half manufactured productions of the east are, no doubt, at all times interesting to those who live by trading with them, and to whom a trifling fluctuation in price may involve the loss or gain of many thousand pounds. The interest and importance of these things, however, is every year becoming more apparent, as people learn the important fact that these staple productions, as they are called, are the great bonds of union which bind countries together in the peaceful relation of international commerce; and that in many cases the great question of peace or war depends less on conventions, diplomacy, or treaties, than it does on the wants of manufactures and the necessities of commerce. The ordinary productions of the East are, doubtless, well-known and appreciated; but how many there are about which we know little or nothing? how much there is yet to be learnt, not merely of unexplored natural riches, but even of the things used by the natives for many ages? These, then, are matters full of interest for the manufacturer and the merchant, as well as for the natural philosopher or man of science.

But traders and merchants have yet more to learn; by examining the manufactures of India, they may in many cases glean valuable hints from the artizans of eastern countries, and at the same time they may learn how best to suit their own wares, designed for eastern markets, to the wants, habits, and peculiarities of those for whom they are designed.

Returning again, then, to the East Indian department of the Great Exhibition, there can be no question that as it was one of the most interesting, so it was also one of the most suggestive and instructive portions of the Crystal Palace; and every one who attempted to study the innumerable articles collected together felt, at the close of the Exhibition, that the time was too short to make even a cursory examination, and regretted that they could not have another six months to complete it. It was this feeling, coupled with the fact that, large as the Indian collection was, it by no means fully represented either the arts or the productions of India, which led the Society of Arts to propose the East Indian Exhibition of 1853; and the satisfaction with which the announcement was met in all quarters amply proved that the proposal was thoroughly appreciated by the public. One objection, and but one, has been raised, and that was, that only two years having elapsed since THE EXHIBITION of 1851, there would be hardly time to collect sufficient materials for the Indian Exhibition of 1853, and that it would therefore suffer by being compared with the former Exhibition. It is plain, however, that even if many years elapsed between the two Exhibitions, some persons would be sure to draw comparisons; and yet it is also equally plain that as the conditions which gave rise to the two collections are perfectly distinct, the two ought not to be compared. This year's Indian Exhibition will, no doubt, want the attraction of the "Koh-i-noor," and some of the other lions of the Exhibition of 1851; but, on the other hand, it will probably possess many points of interest which were wanting in the former one. The determination, too, of the Council to accept the offer of the Executive of the Dublin Exhibition, and to hold the Indian Exhibition of 1853 at Dublin, was certainly a wise one, and must altogether prevent the possibility of any comparison with that held in Hyde Park, which, as the first English International Exhibition, and considering the peculiar circumstances under which it was produced, can never fairly be brought into rivalry with future Exhibitions.

Contributions from India, it is probable, will now soon begin to arrive, and British Exhibitors of Eastern articles, of whom there are a very large number throughout the country, will very shortly be reminded that it will be necessary for them to send in space vouchers and lists of the articles they propose to exhibit. The Indian Exhibition Committee are now entering on the last and most arduous part of their duties, and if the various promises of support which have already been made to them are faithfully performed, they cannot fail to bring their labours to a most satisfactory and gratifying conclusion.

## COLONIAL CORRESPONDENCE.

### TRINIDAD.

The Trinidad "Corresponding Committee of the Society of Arts" have, with the sanction of the Governor, offered a series of prizes, with the view of encouraging the industry of the island. The date of this industrial exhibition has not yet been agreed upon; but the prizes (consisting of twenty-five, ten, five, four, and three dollars) were to be given for the best specimens of cattle, poultry, sugar, cocoa, coffee, tobacco, cotton, rice, Indian corn, arrowroot, plantains, yams, cushcush, cassada, farine, sweet potatoes, fruits, spices, oils, flowers, &c. The *Trinidadian* says upon the subject:

> "His Excellency the Governor having obtained from the Council of Government a vote of 100*l*., with the view of offering prizes, 'for the purpose of encouraging the industry of the Island,' has directed the Corresponding Committee of the Society of Arts to advertise the different prizes, which at some short date will be thrown open for competition. This measure of his Excellency has met with general approbation. Public exhibitions have always proved very effective agents in the cause of advancement. It is one of the peculiarities of the human mind to endeavour to imitate every object from which any benefit is likely to result; therefore, in promoting that quality in the inhabitants, much good may be expected. We are happy to see that prizes are offered for the best samples of tobacco, cotton, and rice. In several parts of the Island the soil is admirably adapted for the cultivation of those articles, and it is indeed to be regretted that, until now, they form so small—indeed, we may say, no part of the staples of the colony. Let us trust that every effort will be used to produce good samples of those articles, and the qualities exhibited may induce some of our planters to give a little attention to such cultivation. Notwithstanding the Ramos process, or all the other processes which skill and ingenuity may devise for the improvement of the manufacture of sugar, we fear, if the present policy of the mother country be continued, that chief staple of these islands will never repay the cultivator. Therefore it is praiseworthy in the Government to use every means available to promote every source of industry, so far as we may, if possible, taste again even a drop of our wonted prosperity, and be a little more independent of the favours of Britain and her philanthropists (?)"

## HOME CORRESPONDENCE.

### THE SOAP DUTY.

Sir,—It is a principle very generally recognised by political economists, to apply a surplus revenue for the removal of those taxes which restrict the consumption of the real necessaries of life, and at the same time bear with the greatest hardship upon the manufacturers. Upon these grounds I assert a claim for the repeal of the soap duty.

I need scarcely attempt to prove that soap is a necessary of life; this fact I take to be granted, as the effect of cleanliness upon the health and morality of the people has been very powerfully admitted by the erection of baths and washhouses, and the general anxiety manifested for sanitary improvements; but I much fear that the efforts in the good cause are, to a great extent, neutralised by the heavy Excise duty upon soap, which, by nearly doubling its cost, places it beyond the reach of the most necessitous. This argument receives very convincing testimony when the very inadequate increase in the consumption of soap is compared with sugar and other articles by the improved condition of the people.

The allowance of soap to inmates of the workhouses is about ten pounds per head per annum. Assuming this to be no more than is absolutely required, I find that the quantity used for home consumption would only supply, at that rate, 15,790,000 persons; and it may therefore be concluded that the cost of soap, owing to the duty, thus deprives 5,000,000 persons in Great Britain, "the unwashed," of this most important necessary of health and cleanliness, or restricts the whole consumption in that proportion.

The term "unwashed" signifies a man whose intellect is degraded by the filthy condition of the body; and when the structure of the skin, with its millions of pores is considered, not one of which can be stopped without injury to the whole system, and which prevents the enjoyment of a perfect state of health, the cause of his intellectual inferiority is at once ascertained. The connection between the mind and the body, though not to be explained, is so striking as to force itself upon the notice of the least observer; there is such sympathy between the two, that the one cannot suffer and the other be unaffected. The imperfect state of health produced by the want of cleanliness, and not using soap, creates an ungovernable appetite for stimulating liquors; and this is a failing in so large a part of the population, that its pernicious effect on the nation is incalculable. The want of cleanliness also produces disease, and a generally debilitated physical state of many of the poorer class. This causes a constant burden on the poor rates.

Moreover, it is well known that the Excise duty presses very heavily upon the manufacturer. In the first place, he is denied the use of many valuable materials, such as olive acid, cocoa-nut oil, &c., which produce soap slightly heavier than the specific gravity fixed by the Excise. It would thus be subject to the silicated duty, which, in fact, amounts to a prohibition. The hardship of this has been frequently declared, and was shown to the Chancellor of the Exchequer in the spring of 1851, when a sample of foreign soap was exhibited to him, which, by paying the Customs duty only, was admitted at 2*l.* per ton less charge than the Excise duty to the home manufacturer for the same article,—thus offering a bonus to the foreign maker; an anomaly which, it is believed, does not exist in any other trade.

In the second place, the duty is more easily evaded by the dishonest trader than any other. The manufacture is much quicker than malt, and the purchaser has no guarantee that the duty has been paid, as it bears no Excise stamp, like paper. Thirdly, it is a chemical operation of a very uncertain result. The duty is charged upon it before the quality is ascertained; thus, if imperfectly made, it is sold at a great loss to the maker, both of money and reputation, as he is not allowed to remake it; in this instance again acting with more harshness upon the manufacturer than any other Excise duty.

The duty being only collected eight times a year, has brought a number of persons into the business who trade only on the capital thus found them, upon terms that no respectable manufacturer can compete with; and periodically, as the duty becomes due, a large quantity is sold under prime cost, to raise the necessary funds. No security is taken by the Excise for the duty, as their losses by soap-makers will show. Another great annoyance to a chemical manufacturer is the complete prevention of scientific experiments by the Excise regulations; and should any improvements be made, they are immediately divulged, either by the exciseman, who is constantly on the premises, or by the officers, whose duty it is to survey all the soap-makers in his district. G. F.

## TRADE MUSEUMS.

SIR,—I observed with much interest the Report of t Council of the Society of Arts upon the intention of H Majesty's Commissioners for the Exhibition of 1851, promote the formation of a Trade Museum, in whi samples of every kind of produce which becomes article of commerce, either as an export or an impor should be deposited for the benefit of the commerci and general public. The proposal of an institution of character so extensive and practical cannot fail to attra a considerable amount of interest from all classes, and trust that the active co-operation of the Society will cheerfully given towards the development and fu realization of the scheme.

The importance to mercantile men of possessing acc rate information as to the quality of produce and man factures of the countries with which they are tradin and the difficulty often experienced of effecting contrac in the absence of samples, might be supplied by such Museum. But allow me to observe, that to render practically useful to merchants, it would require, first, t be within their immediate reach, and then to be so com plete a collection as to represent not only the averag qualities of articles, but all their various gradation constantly renewed for every new crop, and enriche with specimens of new manufactures. Both thes requisites will be found of extreme practical difficult in the carrying out of the proposal. The first will natu rally suggest the idea, within reach of whom? Sample of grains, and of all kinds of colonial produce, may b as much wanted for immediate reference in Liverpool o Glasgow as in London. Samples of manufactures wil naturally be found necessary at Manchester, Leeds, and other manufacturing towns. I am not aware of the intention of the Commissioners as to the use to be made of such a Museum—whether it is intended to be for purely scientific purposes, or for active commercial advantage. In the latter case the samples should be sufficiently large to allow portions of them to be transmitted throughout the country to any merchant or broker making application for them. In the second place, as to the completeness of the collection with respect to qualities, it will be found necessary in many cases to have samples of even special manufactories, such as of Italian silk, some of which, even in the same town, bring higher prices than others. And as for manufacture, I am hardly competent to describe the manifold variations in the value of articles arising from the newness of the pattern, the fineness of the texture, or the richness of the colours. As to samples of grains, it will be requisite to have them from every shipping port, and indeed even from the different inland towns whence the grain is carried into the shipping ports for shipment. As, for example, a cargo of Ancona or Indian corn may contain the quality of Ravenna or of Pesaro, the former weighing many pounds per bushel more than the latter. This may be indiscriminately illustrated with regard to all articles.

Together with the samples, there might be statistical accounts respecting each article. With the samples of grains there might be the number of acres sown with each kind in all countries, the average produce per acre, the cost of carriage to shipping ports, and all necessary expenses to put it free on board. With the samples of silk, the quantity produced in each country, in each town, and of each spinning; the expenses, and commissions, and cost of carriage by land and by sea; and likewise of every other article, such as flax, hemp, leather, hides, wine, paper, glass, provisions, tallow, wool, ivory, rum, cocoa, cochineal, cinnamon, pepper, oil, tobacco, sugar, coffee, tea, indigo, iron, coals, copper, tin, gold, silver, salt, and manufactures and machineries of all kinds; so that we should by this means have constantly before us the progress of all countries in their produce and in their manufactures. Information should also be received on financial subjects, comprising public debts, with the various kinds of stocks and interests thereon, shares, mining, railway, commercial or banking, and all other kinds of public securities. Then as to shipping; the number of vessels and tonnage entered inward and outward, to and from all countries; of vessels and tonnage belonging to each, and their coasting trade, together with all information upon inland navigation. The currencies, exchange, weights and measures, of all nations, would naturally be requisite. How long the differences now existing in every state, and in some cases in every town of a state, are to continue, can hardly be calculated on. The bringing together all such documents, and exposing such palpable facts before an intelligent world, would perhaps do much towards the removal of an inconvenience severely felt by all. Information should be obtained from all Trinity Houses and Harbour Commissioners of all notices important to navigation, relating to light-houses, quarantine, rocks, and sandbanks. The legal information should contain all the laws and ordinances enacted in all states, copies of common law reports, and all official papers issued by the various departments, together with treaties of commerce, and all other important Government notices or accounts. The great object to be aimed at, that of realising an international code of commercial law, by which merchants of all countries may know the laws regulating mercantile transactions everywhere, may receive a new stimulus by the very fact of collecting information on the subject and directing the public mind to its utility.

Besides receiving extensive original information from all countries, the Museum would be found immensely useful for giving to the information which is now constantly before the public, in the shape of Trade Circulars and Board of Trade accounts, a new life, by the perspicuous arrangement of subjects and figures. Mercantile circulars possess now an extensive importance. They furnish the amplest and clearest accounts of the trading of preceding weeks, months, or years; the soundest views as to the future courses of prices; a careful appreciation of concomitant events, political, commercial, or financial, and the most exact accounts as to the possible extent of new crops and production, with some data as to the distribution of supplies. These circulars are now scattered here and there; the information therein contained is received by merchants with their group of letters, and mixed up with their thousand files. It would be of invaluable importance to collect all such circulars, to extract all the information they convey upon each article, and place them in juxtaposition with the samples and other statistical accounts, marking the authority for such information. These circulars should, moreover, be separately arranged according to towns, and they might be received from all shipping and commercial towns in both continents. The same should be done with the Board of Trade accounts. They contain a rich store of information, but for want of practical arrangement, they become comparatively useless to the mercantile classes.

I am glad to learn that there is some chance of the provincial institutions being allowed to receive copies, gratis, of all Board of Trade and Parliamentary accounts of a commercial and economical character. Such public information should be rendered as practically useful as it can possibly be made, by proper arrangement and by publicity.

Having so far extended as to the kind of samples and documents to be placed in the Museum, let me say a few words as to their systematic distribution.

It seems to me that to fulfil the object of the Museum they should all be placed in a duplicate form. Each country and each article should have its proper department. In the first division, each country should be exhibited with the samples of all its productions and manufactures, and all the statistical, economical, commercial, and legal information connected therewith. In the second, each article should be shown with samples of all its qualities and different gradations, with information as to the quantity produced, cost, and carriage from all countries.

As for the site, I should urgently call the attention of the Council of the Society of Arts to the memorial from the London merchants, in which they suggest, "that in order to render such a collection really available for trade purposes, it should be formed in the City of London, and so situate as to be conveniently accessible to those who want to refer to it." Let me allude to the "Gresham College," which was founded for similar purposes in the very heart of the City, at which professorships were established on many branches of practical science. I cannot enter on the subject of want of space in the City, but I quite conceive that if the City merchants were to co-operate with the Royal Commissioners and the Society of Arts, space and a capacious building would be found.

Yours, &c., LEONE LEVI.

## TRADE GUILDS.

SIR,—The active members of your Society seem to be trying to do something which shall give a serviceable character to the Society's proceedings. With this view they entered readily into the suggestion of organising a staff of lecturers for Mechanics' and Literary Institutions through the country, but apparently with little hope of permanent success; for these institutions are for the most part resorts for amusement. While the *éclat* of some titled patrons are around them, they thrive; that withdrawn, they fade. But a more substantial class of bodies exists, who really are in want of the spirit which this Society is calculated to communicate. I mean the trading guilds of the city of London. The courts of these Companies are armed with powers over the productions of their trades, and with funds which might be judiciously employed in promoting the progress of the trade, either with reference to the excellence of the manufacture or the extent of its consumption. Unfortunately they have fallen into great abuses Men following no occupation, military and legal men, are found in large proportions among the blacksmiths, goldsmiths, turners, pewterers, &c., of the city of London. Of course their influence on and connection with the crafts whose names they bear is merely nominal, and their service useless. If, however, this Society could revive the original spirit which constituted these bodies, and make them the instruments for giving to every apprentice such knowledge as would be useful in his particular mystery, or at least the opportunity of gaining such knowledge, then a substantial benefit would be done.

Your's, J. J.

## TRUST-DEED.

SIR,—I wish to bring before your notice a matter of immense consequence to Institutions generally; it is their enrolment by Act of Parliament. I have urged this upon our Members, who gave me hopes of such a motion being brought forward this Session. We have been great losers by the non-enrolment of the Mechanics' Institution, having lost in 1850 a library, containing upwards of 2,000 volumes, and other property which had cost more than 400*l.*, through a difference existing among the members, and upon which difference the magistrates could not arbitrate, simply through the Society being an illegal one. The result was a split between the members,—about 150 seizing the whole property, and the remaining 600 members being left without anything. They consequently established our present Institution; and the old one (the Working-man's Institution), after struggling for some time, finally disposed of the greater portion of the property for about 12*l.*, and ceased to exist. This difference and sacrifice of public property occurred through a small portion of the members wishing to introduce works of an objectionable tendency into the library. I dare say many other similar cases could be cited in the annals of Literary, Scientific, and Mechanics' Institutes, which would never have occurred if they were enrolled.

I should think petitions, praying both Houses to pass a law to enrol such institutions, would be favourably received. I should like to hear the opinions of others upon the subject. J. H.

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Sir,—If I might make a suggestion to the Society of Arts, I would strongly urge the necessity which exists for a well-drawn model trust-deed for Mechanics' Institutions; one so drawn that it would answer for both the real property of institutions (such as the building, ground, &c.) and the books, furniture, apparatus, &c. A legal gentleman long connected with mechanics' institutions, and who is thoroughly acquainted with their constitution, is of opinion that nothing short of an Act of Parliament will grant the protection necessary for securing the books, &c., from being detained by any person who takes them out. He writes: "My impression is, that an Act of Parliament will be found indispensable for full protection, though no doubt protection to a limited extent may be attained by carefully-drawn trust-deeds." If the Council of the Society of Arts would take up the question, it would confer a great boon on all the institutions in connection with it.

Your's, &c., H. D.

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## STEAM NAVIGATION.

Jan 17th, 1853.

Sir,—A correspondent in the article on the "Progress of Steam Navigation," No. VII., p. 76, is in error in believing the law of tonnage obliged ship-builders to make bluff bows and sterns. The old law (now repealed) by leaving out the important item depth, gave them the opportunity to build; and as the Navigation Laws compelled ships to carry a certain number of men and boys per 100 tons register instead of burthen, ship-owners were not slow in insisting on having ships built that would carry nearly double their register tonnage. Secondly, the "Witch of the Wave," "Challenge," and other ships named, have no auxiliary power whatever, the increased speed being entirely due to the improvements in hull, rig, and sails, brought out by the competition now going on between this country and America.

I remain, Sir, yours truly,

W. Roberts.

## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Institute of British Architects, Jan. 10.—Mr. D. Mocatta, V.P., in the chair. Mr. Donaldson, V.P., read an interesting paper on Byzantine Architecture in France, in which he pointed out the analogy existing between the churches of the ancient Greek Empire and those which were built in France in the eleventh and twelfth centuries; and showed that that analogy, though not complete in all its details, was sufficiently so to authorise the classifying them under one modified name, and attributing them to one common type. He instanced various churches in the heart of the central provinces of France, which would come under the term Gallo-Byzantine, explaining what were their characteristics, and how the Byzantine element was developed or modified in them. Mr. Donaldson having concluded his remarks, a conversation arose upon the topic under discussion, in which Dr. Henzlmann, Mr. Inman, Mr. G. G. Scott, Mr. Papworth, Mr. Alfred Bailey, and Mr. Billing took part.

Geographical Society, Jan. 10.—Sir Roderick J. Murchison, President, in the chair. Captain Allen, R.N., read a paper on the feasibility of forming a canal between the Gulf of Akaba and the Dead Sea. The paper was principally devoted to an attempt to account for numerous appearances of sudden and violent drainings on the sides of the basin of the Dead Sea. The level of the Dead Sea, as is known, is considerably below that of the Mediterranean—a fact which, although known, has not, according to Captain Allen, been satisfactorily accounted for. He made certain observations during his travels along its shores, and had come to the conclusion that the Gulf of Akaba, on the north-eastern point of the Red Sea, was at some distant period connected with the Dead Sea, although the channel is now filled up, either by a gradual upheaving of the land, by the growth of coral, by the deposit of sand and gravel thrown up by the sea, or by the sand of the desert. The tract of country between the Gulf of Akaba and the Dead Sea does not seem as yet to have been satisfactorily surveyed; but Captain Allen concludes that the Dead Sea was also originally connected with the Mediterranean, the Lake of Tiberias being one of the links of the chain; and that by evaporation the intervening district was dried, and by upheavals or otherwise, barriers made, which have now divided what might have been an unbroken sea into a series of lakes. The Secretary then read a paper entitled "Outlines of a Journey in Palestine in 1852," by the Rev. Dr. E. Robinson and others, communicated by his Grace the Duke of Northumberland.

Institution of Civil Engineers.—Jan. 11.—J. M. Rendel, Esq., President, in the chair. The paper read was "On the Nature and Properties of Timber, with notices of several methods now in use for its preservation from decay," by Mr. H. P. Burt, Assoc. Inst. C. E.

The author first examined the different species of home and foreign grown timber, their various properties, uses, tendencies to decay under certain circumstances; the most apparent causes of dry rot, the formation of fungi, and the action of wet and heat; noticing the extraordinary duration of specimens of timber found in Egypt, in the ruins of Nineveh, and in the more recent monastic and castellated edifices of this country. The chemical constitution of wood was examined, in order to trace the origin of decay, and to lead to the consideration of the most efficient means of arresting it. The necessity for some efficacious and yet moderately cheap system of preserving timber was insisted on, from the great demand for that material for various engineering works; and in some countries, devoid of good means of inland communication, it had been found more economical to buy fir timber in the north of Europe, and saturate it with creosote in England, and then convey it to where it was required.

The earliest record of preserving animal and vegetable substances was traced back to the Egyptians, whose mummies were embalmed by being boiled in pitch, which was found floating in the lakes; the linen and the timber so preserved gave the idea in the last century for adapting the process to the wants of the period, and several of the patents granted were enumerated and commented on.

The paper was illustrated by a series of models and drawings, showing the various apparatus for the several processes, enlarged diagrams of microscopic views of sections of several kinds of timber, both in the natural state and after being creosoted; experiments on the degrees of saturation by the process, and on the transverse strength of the timber; with the results of the improvements introduced into the system by the author, whose experience had been very extensive.

Jan. 18.—J. M. Rendel, Esq., President, in the chair. The discussion on Mr. Burt's paper "On the Preservation of Timber," occupied the whole of the evening. Mr. Bethell entered at great length into a description of the process of Creosoting timber, and the mechanical contrivances for accomplishing that object.

## PROCEEDINGS OF INSTITUTIONS.

BAKEWELL.—On Tuesday the 11th inst., an interesting lecture was delivered in connection with the Bakewell and High Peak Institute, on "Hannibal and the Second Punic War," by the Rev. H. K. Cornish. The lecture was one of a series on Ancient History from its earliest period. The lectures in connection with this Institute are generally well attended; and there can be no doubt whatever that it is working its way gradually, and effecting considerable improvement among many persons who have never been within the reach of such literary advantages as are furnished through the medium of this Institution. Independently of the lectures given from time to time by different lecturers on the most interesting subjects in History, Biography, Natural History, Natural Philosophy, the Drama, &c., there is an excellent library belonging to the Institution, which is well supported and is gaining continually fresh accessions of books and subscribers.

CHELTENHAM.—On Tuesday evening, the 11th inst., Dr. Humphreys, the head master of the Cheltenham Grammar School, founded in the reign of Queen Elizabeth, delivered a lecture at the Literary and Philosophical Institution, on "Freedom *versus* Absolutism, or the Coming Struggle." The president, W. M. Tartt, Esq., in introducing the lecturer, observed that the title of the lecture with which Dr. Humphreys was about to favour them had excited some apprehension lest it should infringe upon a supposed regulation or law of the Institution, which excluded religion and politics. He should tell them there was no such law; but it had always been, very properly, the custom to exclude controversial theology and party politics. In dealing with any of these subjects as historical or abstract questions, much must be left to the lecturer himself; and when they considered the talent and high position of Dr. Humphreys, they would agree that this council were perfectly justified in placing the fullest confidence in his judgment and discretion.

The lecture was a very able one, and was greeted throughout with loud applause; and the announcement of a second lecture by Dr. Humphreys was most cordially received.

HALSTEAD.—The Ninth Annual General Meeting of the Mechanics' Institute was held on Wednesday se'nnight, G. W. Harris, Esq., Vice-President, in the chair. The Report expressed the gratification of the Committee at the decided progress made during the past year, a considerable increase in the number of members having been effected; and also at the superior accommodation provided for the Institute in the New Town Hall, through the kind consideration of the Committee of the Town Improvement Company. It further set forth the advantages anticipated by the union of this Institution with the Society of Arts, in the greater facilities for securing popular lectures. Regarding this as a new era in its history, the Committee expressed the most sanguine hopes of increasing prosperity. Although this Institution had been considerably crippled for some time past in its efficiency for want of suitable accommodation and lecture-room, much had been quietly effected during the nine years of its existence through the agency of a well-selected library and a liberal supply of newspapers. The reading-room was well frequented, and the interest of the members in its welfare unabated, whilst the funds were maintained. The number of members is 157, and the exchanges of books generally exceed 4000 annually. All the members of the Committee, with one exception, were re-elected. Votes of thanks were passed to the Committee and officers for their services; and also to E. Hornor and J. G. Shepherd, Esqrs., for valuable books, &c., presented to the Institution.

HARROGATE.—On Tuesday evening, Mr. Ross, of York, delivered a Lecture to the members and friends of the Mechanics' and Literary Institute on "Decision of Character." The qualities of mind essential to decision of character were largely and ably dwelt upon by the lecturer, who illustrated his subject, and fortified his positions by referring to the conduct and achievements of many eminent individuals.

LOUGHBOROUGH.—On the evening of Tuesday, 11th inst., a *Conversazione* of the members was held in the Society's Room, which proved most instructive and interesting. The room, on the occasion, was converted into a temporary museum, by the exhibition of various objects of antiquity, curiosity, and art. All the gentlemen who have given lectures to the Society were invited, and several of them added to the enjoyment of the evening by their presence. A large table was devoted to a profuse and *recherché* provision of refreshments. A company of excellent glee-singers, under the direction of J. B. Cramer, Esq., who presided at the pianoforte, entertained the assembly at different stages of the proceedings. John Cartwright, one of the Vice-Presidents, conducted the business of the evening; and short lectures, as follows were given, which were well received :—Rev. H. Alford, B.D., on "Greek Music;" J. F. Hollings, Esq., on "The Sepulchral Antiquities of Leicestershire;" Rev. A. Fearon, B.D., on "Some interesting Curiosities he exhibited;" Rev. F. Lowe, on "Monumental Brasses;" Rev. Kirke Swan, on "The Total Eclipse of the Sun;" Mr. B. Baldwin, on "Photography;" C. W. Wood, Esq., on "Harmony." The Rev. E. Smythies, Mr. E. Eddowes, and J. Cartwright, Esq., also made some interesting remarks.

**Northallerton.**—On Monday evening, the 20th Dec., Mr. George Richardson, of Thirsk, delivered an admirable Lecture on "Life Assurance," to the members of the Mechanics' Institute. The apparent abstruseness of the subject was pleasingly simplified, and its dryness was altogether obviated by the agreeable style of the lecturer, while the great value and importance of life assurance itself were powerfully set forth.

**Salisbury.**—An admirable lecture was delivered at the Literary Institution on Tuesday last, by C. B. Wall, Esq., M.P., on "Pottery and the Ceramic Art." The lecturer took a rapid survey of the rise and progress of the art in various countries, particularising those in which it had acquired peculiar excellence; and showed some rare and extremely beautiful specimens, from his own collection, of pottery from China, Dresden, France, and our own country. Among these was a tea-pot, presented by one of the Emperors of China to Lord Macartney, at the time of his embassy to that country. It was of singular shape and proportions, but extremely beautiful in material and colours. The lecturer was exceedingly eloquent upon the utility of the ceramic art and its tendency to elevate the taste of the people, and urged the necessity of schools of design, in order that it might be cultivated with more and more success.

**Sudbury.**—On Tuesday, 28th ult., the Rev. A. Anderson gave an interesting lecture at the Reading Room of the Literary Institution, on "The Character of Oliver Cromwell, as a Warrior, a Statesman, and a Christian;" and on the 11th inst., the Rev. C. W. Green, M.A., delivered at the Corn Exchange a very instructive lecture on "Carbon and its Compounds," illustrated by diagrams, and some interesting experiments with carbonic acid gas, &c.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

B. B. (*Loughborough*).—The "Report of the Juries on the Great Exhibition" is published at a price of £1 1*s*.

⁂ The article on Enamels, though in type, cannot appear this week, owing to want of space.

## QUESTION FROM CORRESPONDENT.

*Stamping Letters*—Is there any machinery invented which would supersede the present crude mode of stamping letters by hand? Foreign letters are generally much better marked at their respective post offices than English ones: ours are most slovenly; the ink being bad, is generally rubbed and indistinct. In Courts of justice, it is frequently of great importance to verify testimony by the date and postmark on letters; in many cases this is most difficult, and sometimes impossible, as they are so indistinct. A slight expense would provide new and improved stamps, and confer a benefit on the public. (No. 26.)

## MISCELLANEA.

### CRYSTAL PALACE, SYDENHAM.

The slight improvement of late in the weather has been abundantly taken advantage of by the contractors for the New Crystal Palace and its various outlying works; and since our former notice, a striking progress has been made in all directions. A large portion of the building is already covered with glass, of increased weight and strength, and with a marked improvement as to exclusion of the weather. To the north of the centre transept a long range of the less elevated portion has been taken possession of by Mr. Owen Jones, and serves both as a storehouse for the care of casts, which are almost daily arriving from the Continent, and as a workshop for their junction and erection. In one part —the future Egyptian court — Mr. Bonomi and a numerous staff are at work in forming models of Egyptian buildings, and making and arranging casts of the most characteristic of the treasures of Egyptian art possessed by the nation in the British Museum,—*here* to be brought within the comprehension of a larger class than they *there* attract. In another part lies a Venetian gondola, with its quaint ironwork and carving—one day, with its native gondolier, to be an ornament of the sheet of water in the park. At the other end of the works the building is rapidly rising in height, and some of the ribs of the transept roof are in their places, ready for the glaziers to commence their operations almost immediately. From this lofty portion the view on all sides is very striking, from the spires of London and Westminster, on the one hand, to the wooded hills of Kent on the other. The whole of the park is distinctly seen, and some idea is formed of the nature of Sir Joseph Paxton's task. The broad walk is already laid out, and the various basins are all in a state of great forwardness. The sinking of the well is proceeding with great rapidity, and enormous pipes, three feet diameter, for feeding the fountains, are daily arriving on the ground, and being fixed in their proper positions. Further down is the branch line of rails from the Brighton Railway.

**Boracic Acid.**—A new source of this important substance has recently been discovered in South America; beds of native borate of lime having been found in Iquigne, in the vicinity of the deposits of nitrate of soda. The borate appears to exist in considerable quantity, associated with beautifully crystallised glauberete, or native sulphate of soda, similar to the well-known salt which occurs in the neighbourhood of Madrid. The first shipment of the borate was recently sold at Liverpool, at 60*s*. a cwt.

**Crowley's Safety Switch, and Self-acting Railway Signals.**—By this invention it is intended to make every train work the signals, and also fix the switches at any station to which one may be approaching. As any truck or train enters a station, or is shunted on to the line, the flanges of the wheels will depress a lever, which, acting on an electro-magnet, will release a balance-weight, and cause the danger-signal to be put up at the station, and also at a distance along the line (say from 500 to 700 yards, according to circumstances). When a train has arrived at a distance of, say from 600 to 700 yards of a station, the flanges of the wheels, acting on a small lever in connection with an electro-magnet, will cause all the switches leading to the line on which the train is advancing to become fixed, so that nothing can thoughtlessly be shunted through them while the train is running from the distance-signal to the station. The switches will remain fixed until the train has passed the station. Should, however, it be necessary to attach any additional carriages to a train standing at a station, they may be released by turning a small handle close to the lever-box. When the signals are at "Danger," they will remain in that position until pulled down, so that a neglect of duty will only cause the temporary delay of a train; whereas, under the present system, it may be attended with serious consequences. The cost of application to existing signals, and the expense of maintenance, will be inconsiderable. The signals are now in operation at the Red-hill station, on the Brighton Railway.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

### *From Gazette*, 14*th Jan.*, 1853.

*Dated* 31*st Dec.*, 1852.

1207. T. Harrison—Improvements in steam-engines.
1209. T. B. Smith—Calcining ores, construction of furnaces for that purpose, and converting certain products into an article of commerce not hitherto produced therefrom.
1211. J. Lord—Improvements in carriage-steps.

*Dated* 1*st Jan.*, 1853.

1. W. Wilkinson—Taps and filtering apparatus.
3. J. Addison and H. S. Eicke—Tessellated pavement.
4. J. S. J. Eicke—Deodorising American and other resins for mixing with grease, tallows, and wax, &c.
5. J. J. W. Watson and W. Prosser—Manufacturing steel and carburizing iron.
6. T. Billycald—Apparatus for looped fabrics.
7. J. Brough—A new manufacture of a vitrified substance, and its application to various useful purposes, and new applications of known plastic substances.
9. M. Tomlinson—Manufacture of "species," or show-jars.

*Dated 3rd Jan.*

10. David Hulett—Ornaments for lamps, &c., and architectural purposes.
11. J. Bleackley—Machinery for washing, bleaching, &c., yarns and fabrics.
13. L. F. Vaudelin—Retarding and stopping railway-carriages.
14. C. E. Amos—Centrifugal pumps.

*Dated 4th Jan.*

15. P. A. C. de Fontainemoreau—Improvements in axle-boxes. (A communication.)
16. E. C. Shepard—Manufacture of gas.
17. J. J. Welch and J. S. Margetson—Travelling-cases, wrappers, and articles of dress hitherto manufactured of leather.
19. G. Gwynne and G. F. Wilson—Treating fatty and oily matters.
20. W. E. Newton—Atmospheric engines. (A communication.)

*Dated 5th Jan.*

21. J. B. Pascal—Motive power.
22. G. Eugene M. Gerard—Manufacturing and treating caoutchouc.
23. G. P. de L'Huynes—Medical portative electro-galvanic apparatus.
24. T. Shilton—Weighing-machines.
25. C. F. Whitworth—Railway signals.
26. F. Edwards—Lettering, figuring, and ornamenting enamel for dials, &c.
27. F. Arnold—Heating water in bath or other vessel.
28. H. N. Penrice—Propelling vessels.
29. W. Bendell—Treating sewage waters and matters.

*Dated 6th Jan.*

30. E. Grillett—Renewing teeth of files.
32. E. Hutchinson—Preparing, drying, and treating wheat and other grain.
34. R. W. Savage—Alarum bedstead.
36. R. Whinery—Manufacture and treatment of leather, with or without other materials.
35. W. E Newton—Roving, spinning, &c., cotton, &c., called "Larwill's Improvements." (A communication.)

*From Gazette*, 18*th Jan.*, 1853.

NONE.

## WEEKLY LIST OF PATENTS SEALED.

*Dated 12th Jan.*, 1853.

15. Joseph Barker, Kennington-lane—Improvements in fastenings.
22. Henry Walker Wood, Briton Ferry, near Heath—Improvements in the construction of ships and other vessels.
31. John Dunkin Lee, Leadenhall-street—Improvements in covering railway trucks and other vehicles.
34. Robert Beath, Godmanchester—Improvements in the manufacture of bricks and articles through moulding orifices.
35. Thomas Huckvale, Choice Hill, near Chipping Norton—Improvements in instruments for administering medicine to horses and other animals.
39. Felix Abate, 21, George-street, Hampstead-road, and John Julius Cléro de Clerville, Newman-street—Improvements in preparing, ornamenting and printing on surfaces of metal and other substances.
41. Joseph Barrans, Queen's-road, Surrey—Improvements in steam engine boilers.
45. Charles William Rowley Rickards, 28, New Cut, Blackfriars-road—Improvements in tongs for screwing pipes and tubes.
47. Stephen Perry, Red Lion-square—Improvements in inkstands or inkholders.
48. Edmund Morewood, and George Rogers, Enfield—Improvements in rolling metal.
49. Edmund Morewood, and George Rogers, Enfield—Improvements in coating metals.
124. John Husband, Highway, New-road—Improvements in paving roads and other surfaces.
125. Thomas Hunt, Lemon-street—Improvements in fire arms.
130. Isaac Westhorp, 9, George-yard—Improvements in grinding wheat and other grain.
137. John Jackson, Exchange-court, Liverpool—Improvements in gas burners.
141. Astley Paston Price, Margate—Improvements in the manufacture of citric and tartaric acids, and of certain salts of potash soda, ammonia, lime and baryta.
167. Joseph Faulding, Edward-street, Hampstead-road—Improvements in machinery for sawing and cutting wood and other substances.
169. Moses Poole, Serle-street—Improvements in machinery for mowing and reaping.
243. Samuel Getley, 6, Ivy-street, Birkenhead—Improvements in water closets.
244. Joseph Westby, Nottingham—Improvements in machinery applicable to the manufacture of lace, and other weavings.
245. William Dray, Swan-lane, London-bridge—Improvements in machinery for reaping and mowing.
247. Christopher Nickels, York-street, Lambeth, and Frederick Thornton, Leicester—Improvements in weaving.
271. Joseph Westby, Nottingham—Improvements in twist lace machinery.
272. Joseph Hill, Birmingham—Machine for stamping metals and forging iron and steel.
276. Francis Warren, 16, Millbank street—Improvements in gas burners
277. Admiral the Earl of Dundonald, Belgrave-road—Improvements in coating and insulating wire.
278. William Adolph, 9, Bury-court, St. Mary Axe—Improvements in apparatus for warming and ventilating rooms.
295. Peter Ward, Oldbury, Worcester—Improvements in the manufacture of sal-ammoniac, and obtaining salts of ammonia.
336. Charles Matthew Barker, 22, Portsmouth-place, Kennington-lane—Improvements in sawing wood.
337. Henry M'Farlane, 8, Lawrence-lane—Improvements in stoves and fireplaces.
357. Thomas Barnabas Daft, Isle of Man—Improvements in land conveyance.
376 Henry M'Farlane, Lawrence-lane—Improvements in constructing metal beams or girders.
389. James Webster, Leicester—Improvements in the construction of springs.
390. John Swindells, Pollard-street, Manchester, and William Nicholson, Manchester—Improvements in obtaining oxygen gas, and applying it in the manufacture of various acids and chlorine for oxidating metallic solutions, and for ageing and raising various colouring matters.
413. Charles Tiot Judkins, Britannia Works, Manchester—Improvements in machinery or apparatus for sewing or stitching.
420. John Oliver York, Paris—Improvements in connecting and in fixing rails in railway chairs.
432. Edwin Heywood, Glasburn, Yorkshire—Improvements in looms.
446. Robert Bird, Crewkerne, Somerset—Improvements in straining webs of saddles.
448. James Otams, 2, Horton-villas, Camden-road, Holloway—Improvements in the manufacture of manure.
464. John Gilbert and Samuel Nye, 79, Wardour-street—Improvements in mincing meat and other substances.
469. Robert Hoppen, Plymouth—Improvements in apparatus for mincing meat.
480. John Fowler, Temple-gate, Bristol—Improvements in machinery for draining land.
481. John Fowler, Temple-gate, Bristol—Improvements in laying wires for electric telegraphs.
482. John Fowler, Temple-gate, Bristol—Improvements in reaping machinery.
483. John Fowler, Temple-gate, Bristol—Improvements in machinery for sowing seed and depositing manure.
491. James Wilson, 37, Walbrook—Improvements in printing fabrics of silk, or partly of silk.
509. Charles Watson, 31, Rhodes-street, Halifax, Yorkshire—Improvements in ventilation.
510. John Tayler and James Slater, Manchester—Improvements in machinery, apparatus, or implements for weaving.
621. Bernhard Samuelson, Banbury, Oxford—Improvements in breaking up and tilling land.
657. John Melville, Porchester-terrace—Improvements in the application of iron and of wood, combined with iron or other substances, to buildings and other constructions.
746. Joseph Cowen, Blaydon-burn, near Newcastle-upon-Tyne, and Thomas Richardson, Newcastle-upon-Tyne—Improvements in the manufacture of sulphuric acid.
751. Peter Armande le Comte de Fontaine Moreau, 39, Rue de l'Echiquer, Paris, and 4, South-street, Finsbury—Improvements in lamps. (A communication.)
762. Joseph Burley, Halifax, Yorkshire—Improvements in apparatus for cutting fustians and other fabrics to obtain a cut pile surface.

*Dated 13th Jan.*

36. James Hare, Birmingham—Improvements in expanding tables and music stools.

46. James Stewart, Old St. Pancras-road—Improvements in the action of pianofortes.
122. Duncan Bruce, Canada, North America—Improvements in rotary steam-engines.
300. Professor Andrew Crestadoro, Adelphi-place, Salford—Improvements in impulsoria, or machinery, for applying animal power to railways, waterways, and common roads.
355. Peter Warren, Stratmore-terrace, Shadwell—Improved materials, applicable to many purposes for which papier maché and gutta percha have been, or may be, used.
507. Felix Lieven Bauwens—Improvements in treating fatty matters prior to their being manufactured into candles and mortars, which are also applicable to oils.
532. John Lee Stevens, Kennington—Improvements in furnaces.
556. Charles Arthur Redl, 27A, Davis-street, Berkeley-square Improvements in telegraphing or communicating signals at sea and otherwise
702. Joseph Tringham Powell, 28, Fenchurch-street—Improvements in mixing, baking, and drying materials in the making of biscuits and other articles where plastic matters are employed.
755. James Robertson, Glasgow—Improvements in the manufacture of casks, and other wooden vessels.
778. Henry Vernon Physick, Aberdeen-place, Maida-hill—Improvements in electric telegraph apparatus, and in machinery or apparatus for constructing the same.
812. William Crosskill, Beverley, York—Improvements in clod crushers, or rollers for rolling, crushing, or pressing land.
856. Richard Dudgeon, New York, U.S.—Raising heavy weights by means of a portable hydraulic press.

*Dated 14th Jan.*

3. Peter Spence, Pendleton Alum Works, Manchester—Improvements in obtaining power by steam,
212. Thomas Slater, Somers'-place, New-road, St. Pancras, and Joseph John William Watson, Old Kent-road—Improvements in the application of electricity to illuminating purposes.
265. David Collison, Preston—Improvements in the construction of shuttle skewers.
579. Alfred Vincent Newton, 66, Chancery-lane—Improvements in machinery for cutting corn and other crops.
595. Joseph John William Watson, Old Kent-road, and Thomas Slater, Somers' place, New road, St. Pancras—Improvements in galvanic batteries, and in the application of electric currents to the production of electrical illumination and of heat, and in the production of chemical products by the aforesaid improvements in galvanic batteries.
666. Benjamin Baillie, 118, Wardour-street, Soho—Improvements in apparatus for drawing off and registering the flow of fluids.
685, Robert Knowles, Chorlton-upon-Medlock, Lancaster—Improvements in boilers, and apparatus for generating steam.
695. Robert Buncombe Evans, Colyton, Devon.—Improvements in the manufacture of charcoal.
741. Samuel Sedgwick, Piccadilly—Improvements in lamps.
747. Robert Reyburn, Greenock—Improvements in the composition of lozenges, and other confections.
774. John Hinchcliff, Leeds, and Ralph Salt, Leeds—Improvements in steam engines.
808. George Wilson, York Glass Company, York—Improved manufacture of glass bottles and jars.
827. John Kilner, Thornhill Lees, near Dewsbury, Yorkshire—Improvements in the means of insulating the wires of electric telegraphs.

*Dated 17th Jan.*

11. Thomas Wood Gray, of Warkworth-terrace, Commercial-road, Limehouse—Improvements in cocks and valves.
129. Joseph Cox, of Heston, Middlesex—Improvements in the manufacture of gates and hurdles.
146. Edwin Lewis Brundage, of Jewin-crescent—Improved machinery for forging nails, brads, and screw-blanks.
204. Bendix Ising Jacoby, of Hamburg—Improvements in the means of fixing artificial teeth.
275. Alphonse René le Mire de Normandy, of Judd-street—Improvements in obtaining fresh-water from salt-water.
358. William H. Smith, of Montgomery, Pennsylvania, America—Improvements in the manufacture of lava-ware.
533. Anthony Fothergill Bainbridge, of Putney—Improvements in the manufacture of artificial flies and other bait for fish.
534. Samuel Clarke, of 55, Albany-street, Regent's-park—Improvements in the manufacture of candles.
564. William Bates, of Leicester—Improvements in apparatus for getting up stockings and other hosiery goods.
574. John Gedge, of 4, Wellington-street, Strand—Improvements in printing-presses or machines.
588. George Fergusson Wilson, of Belmont, Vauxhall, and Edward Partridge, of Wandsworth—Improvements in the instruments or apparatus used when burning candles.
592. George Dixon, of Dublin—Improvements in bleaching palm-oil.
600. George Fergusson Wilson, of Belmont, Vauxhall—Improvements in the manufacture and treatment of oils.
602. John Chubb, of St. Paul's Churchyard—Improvements in locks.
620. George Fergusson Wilson, of Belmont, Vauxhall—Improvements in treating wool in the manufacture of woollen and other fabrics.
635. Charles Pryse and Richard Redinan, of Birmingham—Improvements in a certain description of fire-arms.
655. Robert Booty Cousens, of 50, Halliford-street—Improvements in machinery for cutting cork.
656. Admiral the Earl of Dundonald, of Belgrave-road—Improving bituminous substances, thereby rendering them available for purposes to which they never heretofore have been successfully applied.
664. John Arthur Phillips, of 8, Upper Stamford-street, Blackfriars—Improvements in purifying tin.
665. Thomas Hicks Chandler, of Aldbourn, Wilts—Improvements in hoes.
667. William Frederick de la Rue, of Bunhill-row, and George Waterston, of Edinburgh—Improvements in writing-cases.
694. Charles Griffin, of Leamington Spa, Warwick—Improvements in apparatus for fixing type or printing surfaces in a chase.
627. Obed Hussey, of Manchester—Improvements in reaping-machines.
710. James Noble, of Leeds, Yorkshire—Improvements in combing wool and other fibres.
711. Colin Mather and William Wilkinson Platt, of Salford Iron-works, Salford—Improvements in machinery for finishing linen, cotton and other fabrics.
738. Richard Coad, of London, and John Peers Coad, of Liverpool—Improvements in fireplaces and means of applying heat.
740. Admiral, the Earl of Dundonald, of Belgrave-road—Improvements in apparatus for laying telegraphic or galvanic wires in the earth.
760. John Dent Goodman, of Birmingham—Improvements in the boxes and axles for carriages. Being a communication.
761. Samuel Holt, of Stockport, Cheshire—Improvements in weaving cut piled fabrics.
771. John Thomas Way, of Holles-street. Cavendish-square, and John Manwaring Paine, of Farnham—Improvements in the manufacture of burned and fired ware.
772. Isaac Lowthian Bell, of the Washington Chemical-works, Newcastle-upon-Tyne—Improvements in the treatment of certain compounds of iron and sulphur.
785. Peter Carmichael, of Den's Works, Dundee—Improvements in machinery for winding yarn or thread.
786. John Burgees, of Rastrick, Halifax, Yorkshire—Improvement in dying wool.
790. Benjamin Nickels, of 13, Albany-road, Surrey—Improvements in the manufacture of adhesive plaster.
802. John Brettell Collins, of Birmingham—Improved flooring cramp or lifting jack.
818. William Hedges, of Streatham Hill, Surrey—Improvements in carriages.
833. John Frearson, of Birmingham—Improvements in the manufacture of hooks for garments.
862. Andrew Jeffrey, of Chirnside, Berwick, Scotland—Improvements in reaping-machines.

*Dated Jan. 19th.*

211. Thomas Scott, of 111, Drummond-street, Euston-square—Improvements in applying and transmitting motive power, and in accelerating the progress of bodies in motion.
308. John Lewthwaite, of Halifax, Yorkshire—Improvements in cards and tickets, and in machinery for cutting, printing, numbering, and marking cards, tickets, and papers.
452. John Carnaby, of 130, St. John-street, Clerkenwell—Apparatus for turning, managing, and regulating the main taps of gas pipes laid on to houses or buildings, at a part of the house or building distant from the main tap.
627. Alfred Augustus de Reginald Hely, of Cannon-row, Westminster—Improved shade or chimney for lamps, chandeliers, gas, and other burners
713. John Henry Johnson, of 47, Lincoln's-Inn Fields—Improvements in machinery or apparatus for sewing and stitching. Being a communication.
824. John Winter, of Bradford, Yorkshire—Improvements in the mode of combining bars of iron, so as to form larger masses on pieces of iron applicable in the manufacture of axles, shafts, columns, beams, cannon, and other articles.
825. John Winter, of Bradford, Yorkshire—Improvements in the manutacture of wheels.
865. Charles Harford, of Down-place, near Windsor—Improvements in rotatory engines.
871. James Taylor, engineer, of Messrs. Taylor and Co., of Britannia-works, Birkenhead, Chester—Improvements in or applicable to floating graving docks, for repairing and building ships.
880. Alexander Turiff, of the New Town Foundry, Paisley, Renfrew, N.B.—Improvements in moulding or shaping metals.

# SOCIETY OF ARTS.

FRIDAY, JANUARY 28th, 1853.

## EIGHTH ORDINARY MEETING,

*Wednesday, January 26th,* 1853.

The Eighth Ordinary Meeting of the Society was held on Wednesday, the 26th, C. Wentworth Dilke, Esq., Vice-President, in the Chair.

The following were elected Members :

Adye, Capt. J. Miller, R.A., Woolwich.
Adye, Capt. J. Mortimer, R.A., Woolwich.
Allan, James, 7, York-terrace, Regent's-park.
Ball, John, 57, Coleman-street, City.
Barrand, Henry, 23, Camden-grove, Kensington.
Barron, Francis, 436, Strand.
Batchelor, Dr. W., 9, Finsbury-place South.
Belcher, Henry, Whitby.
Bennison, W., 4, Fitzroy-square.
Briggs, Arthur Rennie, Lewes, Sussex, and Reform-club.
Cotton, John, Whitehall-place.
Cooper, John Douglas, 8, New-street, Spring-gardens.
Couchman, John William,
Cruickshanks, Patrick, 17, Gloucester-gardens, Westbourne-terrace.
Davies, T. H., 19, Hanover-street, Regent-street, and Burstead Lodge, Twickenham.
Gray, John, 5, Billiter-square, City.
Humphreys, Edward, Bridgwater Foundry, Patricroft, near Manchester.
Martin, Edward Waller, Guildford.
Maudslay, Joseph, 5, Cheltenham-place, Lambeth.
Moring, Thomas, 44, High Holborn.
Preller, Charles Augustus, Tulse-hill, Surrey.
Reynolds, Capt. H., Blechingley, near Reigate.
Seymour, Henry Danby, M.P., Knoyle House, Hindon, Wilts.
Sheehan, John, Cornwall Lodge, Cornwall-terrace.
Soward, John, 241, Tottenham-court-road.
Tufnell, Edward Carleton, 28, Lowndes-square.
Walker, Robert, 40, King William-street, London-bridge.
Ward, Capt. Edward Wolstenholme, R.E., Woolwich.
Weddell, George, 3, York-place, Kentish Town;

and the names of eleven candidates for membership were read.

A paper was read by James Glaisher, Esq., F.R.S., "On the Chief Points of Excellence in the different Processes of Photography, as illustrated by the present Exhibition." The author commenced as follows :

When, in 1851, the photographic pictures were placed in Class X. of the Great Exhibition, they fell under the careful examination of its jurors, and in writing the report in my official capacity, I preserved as much as possible the individual character of each, that the information so collected might become a means of estimating future advance.

It seemed therefore desirable, as this collection has arisen out of the former, that its pictures should be subjected to a similar examination and description, with the view of showing the actual state of the art at present, and, by comparison, to note its advance in the interval of time which has elapsed since 1851.

One great defect of the present collection is the absence of all information respecting the circumstances under which the photographs have been taken, as to time of year, time of day, clearness of sky, temperature, humidity of the air, &c.; and also without any information respecting the cameras which have been employed.

It was in 1851 a matter of regret that the existing state of photography in England was not well represented. This was owing to the force of restrictions, which, happily, are no longer in operation, and the present collection I believe to be well illustrative of its practice and application.

It is necessary to explain that the conclusions at which I have arrived in the present paper are based upon the examination of all here collected, assisted by the classification and discussion of individual notes, applying to above two hundred of the pictures here collected. These notes are appended to the conclusion of the paper, but will not be read this evening.

I therefore purpose to treat of the various excellencies and imperfections exhibited in the pictures here assembled, for the most part without reference to their producing causes.

[Mr. Glaisher then proceeded to describe in detail the chief peculiarities of the various photographic pictures exhibited. It is obviously impossible to give an abstract of this elaborate and most valuable critique.] In conclusion he said—

I have now enumerated, as far as time has permitted, the leading features of the present collection, which, I have already observed, may be considered illustrative of the condition and application of paper photography.

The exhibitors of 1851, whose works are now before us, are Messrs. Buckle, Owen, Ross and Thomson; Pretsch, of Austria; Martens, Flacheron, and H. Le Secq, of the Continent. From what has been already said, it is to be inferred that the relative position of these exhibitors is not that which they occupied on a former occasion; thus, we find that Mr. Pretsch, the recipient of a prize medal, has since applied himself to the production of pictures of so much larger area, and with such a considerable degree of success, as to have assured to our photographic practice a permanently extended range. Mr. Buckle, the recipient of a Council Medal, on the other hand, has confined himself to the repetition of his beautiful little works, the same now as when they first claimed our admiration, and I cannot but concede the higher place in the present collection to Mr. Pretsch.

Mr. Owen has greatly improved in his practice since 1851, when he exhibited a series of calotype pictures, chiefly landscapes and woodland scenery; they were then adjudged to be somewhat dark and heavy. Nos. 82 and 88, similar subjects, indicate the partial continuance of these defects; but the pictures executed for the Royal Commission, and his more recent attempts at the delineation of interiors, raise him to a higher position in the present collection.

Ross and Thomson, from the greatly increased size and successful results of the large works they have exhibited, are entitled to maintain their former ground.

Mr. Bingham has confined himself to the same subjects as formerly, and with the same results, excepting increased photographic finish, from reiterated practice.

M. Marten's two pictures contributed by Mr. Knight to the present collection, were formerly exhibited in 1851.

Both Le Secq and Flacheron indicate advance as regards the size of their contributions. We trace advance throughout the whole collection in the larger size, and superior application rather than to the increased perfection of the results.

That this should be the case, is referrible to the fact that every increase of size developes, in still greater force, the defects which, under all forms and modes of manipulation, have been attached to photography. In the present collection we have five processes, and their application is well represented. We find the range of practice assigned to the Calotype has been very general, with a leaning, however, to out-door and local scenery. That of the Wax Paper has been more strictly defined; and on the Continent, with the exception of Regnault, we find it employed in architectural designs and fragments of carved and massive ornamentation. In England it has been chiefly employed to perpetuate the passing scene, with little discrimination as to its character. The Albumenised Glass has been applied to general representation; its powers are more especially known in England by the views of Holyrood and the beautiful views of Melrose Abbey; and in France by Ferrier, who has applied it to landscapes, groups of statuary, and various subjects of interest taken from the Exhibition.

The Albumenised Paper is represented by Mr. Goodeve, and has been employed likewise upon groups of statuary.

The Collodion has furnished us with designs of various character, including the entire bulk of portraiture in the present collection. The bias discernible in each process leads us to the investigation of their respective fitness to meet the requirements of general or special application.

To judge solely by the intrinsic excellence of the results exhibited, we must come to the conclusion, that the collodion is the process to be essentially cultivated; with few exceptions, the failing points in the most indifferent specimens are less exaggerated than those either of paper or albumenised glass; it most frequently exhibits a natural interpretation of the lights and shadows, which rarely fails to communicate a similar effect to the subject. We also find that this process, if less eminent in failure, is still more eminent in success, as compared with others here represented. It must be evident to every one, who thinks for a moment on the subject, that a process which combines the excellencies of our best photographs with fewer of their defects, or their defects less exaggerated, is not to be overlooked. I have no doubt myself that the attention of our photographers will continue steadily directed to its improvement, and that before long some successful attempt will be made to secure outdoor representations of larger area than have yet been attempted.

The leading application of the paper process is not that which continued cultivation of the collodion will assign to it. I refer to the representation of woodland and forest scenery, so fraught with difficulty to the photographer. Of the strong resistance they oppose to his endeavours we have abundance of evidence. On all sides we perceive attempt and failure; and that the tree, whether alone and filling the central area of the picture, or one of several, is more imperfectly represented than any of the many creations of art and industry.

The same inefficiency we perceive extended to the representation of woodland scenery, and that the specimens here collected in no degree realize our idea of nature. They are all more or less illustrative of the several modes of photographic failure. The studies, for such I view them, of forest trees exhibited by Mr. Shaw, are among the least objectionable; the beautiful detail of their knotted and rugged stems has afforded full scope for the powers of photography.

Very few of the trees exhibited are perfect in definition towards the top and outermost branches, arising from their continued stirring with the motion of the air. In the same manner the gentle movements of the leaves in summer tend to produce confused results. A more sensitive medium than the paper is required, upon which to obtain an instantaneous impression. Probably this want may be supplied by the collodion, or by Mr. Talbot's instantaneous process.

The representation of running water is a difficulty that points also to a highly sensitive process and an instantaneous impression. In No. 115, a water-mill (on paper) by Sherlock, we have a forcible illustration of the insufficiency of the means employed. The water, descending in a body from the trough above the wheel, gives the idea of a soft and rounded mass, the seeming rotundity being conveyed by the shadow which rounds the edge; the characteristics of water, as exhibited under any circumstances, are totally lost. I have already alluded to Mr. Turner in connection with this defect, and it is a fact worthy of note as relating to the existing practice of photography, that quickly running and ruffled water in the present collection has not in any case been depicted with satisfactory results.

To subjects of no great finish and delicacy of surface, the paper would seem well applied, and its general tone is more in favour of its employment than of the wax-paper. There is a wider range of result among the calotype specimens than of any of the processes here represented. Its use in the present collection has been confined to England, with the principal exception of Pretsch and Du Camp.

The wax-paper is most frequently recognisable by great strength of tone, and by the prevalence of a citrine hue, which, when carried to excess, becomes very objectionable. This process would seem to exceed the paper in the power of discriminating material. Some of the finest specimens in the present collection are due to its employment.

It would seem that the glass processes, either by albumen or collodion, are best fitted for conveying subjects of a smooth and delicate nature; this is evidenced in the present collection, where we find the greatest finish and delicacy attendant upon their results. There is little doubt, however, that the collodion, already beginning, will eventually supersede the albumenised glass in its application.

Of the albumenised paper, as above represented by Mr. Goodeve, I need make no further mention. It will thus be seen that experiment has elicited various processes, differing in their results according to their scale of action. It remains for the future so to apply this knowledge as to develop to the utmost the germ of perfection peculiar to each, and I have no doubt this will be best performed, at the present time, by the strict avoidance of artifice in the perfection of results, now accorded to our practice. It is necessary that we progress by the slow but safe aid of experimental research.

Whether photography will ever exist as an independent art, without assistance borrowed from the artist, is a matter of pure speculation. At the present time there is much to be done before this most graphic process can approach within even near limits to the beautiful semblances of nature we find preserved in the works of our best artists. It is necessary that the photographer should receive a better artistic education; that he should be better acquainted with those laws belonging to science by which the canvass is made to assume the semblance of some of nature's most agreeable effects; it is necessary that he know how to choose his point of view; to decide upon the proper balance of light and shade; to have a correct appreciation of the strength of outline and development of parts belonging to the distances of his picture; that he shall not resort to violent contrasts for effect, and that he shall choose that tone most in accordance with his subject. The true knowledge of these, among other things, must belong to the photographer who would step beyond the level of ordinary practice. To the artistic spirit infused into the Photographic Society, so newly organised, we must look for his better guidance in reference to those points of study; but with all its imperfections, photography may be considered as sufficiently under control to be rendered a subsidiary and highly useful art. This is proved in the present collection; and I am enabled to point with satisfaction to the utilitarian character it is likely to assume. In 1851 it was a matter of regret that we found specimens calculated alone to please the eye or administer to personal feelings; now it is otherwise; we have here indications of its application to the microscope in the specimens exhibited by Messrs. Pretsch and Sims; to the medical profession, in the type of mental disease exhibited by Dr. Diamond; at the same time, the tropical scenery of Du Camp, and the copies of engravings by Messrs. Turner and Berger, alike extend our information and multiply our resources. Nor is the entire collection without its influence in a moral point of view. It is not possible that the collection of such graphic memorials of art and genius can fail to cultivate the eye and diffuse a purer taste among the public generally.

Never in our early days could we have anticipated that the noblest edifices reared by man, in the height of his devotion and his power, could be momentarily arrested in their progress to decay by such transcripts as we now possess.

Possessed of such transcripts—showing alike the creative power of man, and the destroying agency of time—the scroll of the past will be open to the future; and the present generation, educated in the knowledge of the fine and beautiful in art, will lead on to the full appreciation of the truths to be confirmed to posterity, by the agency of this new-born but already powerful art.

A very large number of the photographic pictures are wanting in verticality, and are thus rendered very displeasing. This defect is wholly attributable to negligence, in not properly adjusting the visual axis of the camera. Every photographic camera should be furnished with a spirit-level, to secure horizontal adjustment in the field with facility and certainty.

In some cases it seems that indifferent object-glasses have been used, and in some others, where the object-glass has been good, it has been so ground as to give good definition within very narrow limits. It is probable that experiments are required to determine the form of lens which will give the best photographic picture. At present I should recommend that lens which will show distinctly the greater number in preference to that which would show exquisitely one only; as in practice with the latter the central part may be beautifully shown, whilst the surrounding parts are not; but in the use of the former, we should be certain of an equally good definition over a large area.

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MR. ROBERT HUNT observed, that the information the absence of which Mr. Glaisher had regretted,—namely, as to the time of day, the temperature, humidity, and other circumstances under which the specimens in the Society's Exhibition were taken,—would not have given that nicety of observation which it was desirable to possess. If, however, the photographer, whilst taking his picture, could notice the effect produced with the prismatic spectrum in a given time, it would be of great importance. It was stated by Neipsce and Daguerre, that a picture could be better taken at ten in the morning than at two in the afternoon; and that photographs were more affected, and changed more rapidly, in spring than in summer. Experience confirmed this truth; and it was desirable to ascertain its cause. Did it depend upon the variation in the moisture, or in the temperature of the atmosphere, or upon what other circumstances? In all the specimens exhibited, there was artistically a certain amount of defect; the bright lights were too strong, in contrast with the deeper shadows; and even in the most successful, the objects did not strike the eye as in nature. This was particularly seen in the trunks of trees, in grass, in roads, and red fronted houses; and it arose from the unequal amount of chemical radiation proceeding from those differently coloured surfaces,—mainly because all objects which had any mixture of yellow, orange, or red, in their colour (constituting the browns, greens, yellows, &c., in nature), did not produce the same amount of chemical action as those which, having blues and indigos instead, would produce a greater amount of brightness. The luminous and the chemical rays of the sun were not the same in action, or in the amount of refraction which they underwent in passing through the lens of the camera. If Mr. Fox Talbot's iodized paper were exposed to the action of the prismatic spectrum, the red, the orange, the yellow, and a portion of the green rays would produce no impression on the paper; whilst the blue, indigo, and violet rays, with those beyond, would produce an intense impression. If, however, albumenised paper were similarly tested, the action extended considerably lower into the luminous rays. If collodion were tried, a very great degree of chemical action would be found throughout the whole of the yellow rays; therefore, the extreme sensibility of the collodion process might be explained by its bringing into play a greater amount of chemical radiation. He did not, however, regard the yellow or red rays as having any specific chemical action; on the contrary, the chemical action, and the luminous effect of solar light, were two distinct sets of phenomena, —he believed two distinct principles, which were balanced in the sunbeam in a most remarkable manner. His own experiments proved that light (or the rays producing colour) in fact retarded all chemical effect; and it was, therefore, a question of interference and balance of power; and the use of an extremely sensitive preparation was desirable, in order to get rid of that interference. Mr. Fox Talbot had produced instantaneous action at the Royal Institution, when a picture was obtained upon a glass tablet, from a printed bill affixed to a wheel, and illuminated by a spark from the Leyden jar, whilst the wheel was in rapid motion. That gentleman had added to his preparation a certain amount of spirits of wine and acetic acid, and did not use it till it had assumed a certain vinous smell; and he (Mr. Hunt) believed that the main point, producing the extreme sensibility which the experiment displayed, was to be found in the fact that, during the change which had gone on in the mixture, a combination of the acetic acid with the alcohol had taken place, producing one of the alcohoid compounds. If, therefore, photographers, instead of confining their attention to the iodide of silver, would endeavour to get some of the compounds of the oxide of silver with the various organic compounds, they would arrive at a much higher degree of sensibility, and produce far more perfect pictures than any which were at present exhibited.

The CHAIRMAN said, he might confidently ask the thanks of the meeting to Mr. Glaisher, for the time and ability which he had devoted, not only to the paper which had been read, but to a series of some 400 comments upon the pictures exhibited. It was a matter of regret that the paper could not possibly have been produced earlier; but as the Exhibition would be open during the remainder of the week, the members would still be enabled to examine the specimens, with the important advantage to be derived from Mr. Glaisher's remarks. Some valuable additions to the collection,—including some fine views of Venice, brought over by Lord Granville, had been added within the last few days.—The paper was too long for the Society's Journal, but the Council would give their best attention to the mode in which it might be made available to the members generally.

## COLONIAL PENNY POSTAGE.

**ON Tuesday, February the 8th, (instead of the 9th, that day being Ash Wednesday), an Extraordinary Meeting will be held at the Society of Arts; when a Paper will be read, and a discussion invited, upon the propositions of the Postage Association. It is expected that members of Parliament, and gentlemen connected with the commercial interest, will attend, besides the members of the Society and their friends.**

**A Local Committee, consisting of merchants of the city of London, is now in course of formation, to assist the Council of the Association in their labours. The names of all the members will shortly be published, but we may mention that the following gentlemen have already agreed to join the Committee; Baron L. Rothschild, M.P.; George Moffatt, Esq., M.P.; T. A. Mitchell, Esq., M.P.; Samuel Gurney, Jun., Esq.; Thomson Hankey, Jun., Esq., Governor of the Bank of England; J. H. Brooking, Esq.; Ingram Travers, Esq.; and J. D. Powles, Esq.**

## HISTORY AND ART OF ENAMELLING.

(*From a Correspondent.*)

**THIS art is one of great antiquity, having been adopted by the Egyptians from an unknown source, and embraced successively by the Greeks and Romans; since which it has been a favourite material for embellishment among most nations.**

**The Anglo-Romans were acquainted with the art, as were the Gallo-Romans; and it is intimated by French antiquaries, that the enamel manufactories of Limoges were but a perpetuation of the products of the latter people. Even if this be true, it is but reasonable to ascribe to the lessons of Byzantium (the refuge of the arts after the fall of Rome), those beautiful works with which Limoges astonished the world in the twelfth century. She then supplied Europe with all varieties of articles used in the services of the church, elegantly ornamented in enamel. Marked differences in point of colour distinguish the works of this time from those of the following century. They are recognized by the variety of colours, adapted for draperies and other decorations; whilst the fashion which afterwards obtained, of enamelling only the backgrounds of subjects, rendered few colours necessary. It was also customary in the thirteenth century to place heads in relief on the metal figures, or to employ embossed figures, occasionally enamelled and jewelled.**

**The fourteenth century was remarkable for the introduction of a novel process, by which the subject was engraved with a raised outline on a thin plate of gold or silver beaten down, so as to leave an edge for the retention of a coat of translucid enamel of various colours. This process, which was carried to the greatest perfection by the Italian goldsmiths, paved the way to superficial enamelling on copper, which the artists of Limoges, still assiduous in extending the resources of their art, attained in the fifteenth century.**

**At this period, for the first time, appeared actual surface enamels, for the most part executed in transparent colours of the utmost brilliancy of effect, and enriched with small globules, receiving the effect of gems from silver spangles beneath them. The most beautiful enamels of this period are ascribed to Monvearni, who usually enclosed his works in a border of copper-gilt, enriched with pateræ.**

**Under the auspices of Francis I., Limoges rivalled in a new phase of enamelling her earlier productions, by employing beneath her paintings a base work of opaque enamel, occasionally retaining the brilliant colours of her predecessors, but more often employing grisaille on dark fields. Up to the end of the sixteenth century, many artists distinguished themselves in enamel painting; but from the commencement of the seventeenth century may be dated the decadence of Limoges enamel. As the art of painting in solid enamel became improved and extended, the applications of it gave way to the taste for miniature painting.**

**In addition to the enamels above-mentioned, in which the metal ground forms a subordinate feature, enamel was much used as an accessory to goldsmiths' work.**

**In Tuscany, enamel was employed at an early**

date as an enrichment to other arts; for, in 1286, John of Pisa sculptured a group for the high altar at Arezzo, which he ornamented with enamels on silver. The enamellers of Limoges had, probably, from the twelfth to the seventeenth centuries, the monopoly of what may be called enamels proper,—but the goldsmiths of France, Italy, and Germany employed enamel decorations.

Among the goldsmiths of Italy, Cellini employed enamel to heighten the beauty of his works in gold and silver.

The art of enamelling was likewise practised with great success by the German goldsmiths; and many beautiful designs, by Holbein, for enamelled goldsmiths' work, are preserved in the British Museum; from which it may be gathered that the goldsmiths of this country were not unacquainted with the art. Having thus briefly referred to the past history of this interesting art, a short account will now be given of the present peculiarities due to enamels, or which they are required to fulfil, and the methods employed to form coloured enamels either opaque or transparent.

The conditions which enamels are required to fulfil are as follow: "They must be fusible at a certain moderate temperature—they must adhere strongly to the glass porcelain or metal to which they are applied—they must have a certain transparency or opacity, such as will enable the artist to produce the effects of a finished picture—they must preserve a smooth, vitreous appearance after fusion, and be sufficiently hard to resist the friction of solid substances—they must be insoluble in water, and also resist the action of the atmosphere—and, lastly, they must contract and expand to the same extent as the substance which they cover."

Enamels are composed of colouring matters which, for the most part, consist of metallic oxides, and secondly, of fluxes, or vehicles consisting of vitrifiable substances, such as silicate-borates or boro-silicates, in different proportions. The colour of an enamel results either from the colour of one of its constituents, or is the result of a chemical combination of the constituents. In the one case, the colouring matter is simply mixed with the flux, or if the flux combine with it chemically, it does not affect its colouring property; in the other case, the flux has a chemical action on the colouring matter.

Gold, silver, and copper are the metals which are usually enamelled. The enamels used must have their point of fusion below that of the metals to which they are applied. They must be higher for copper and silver than for gold. They must be very fusible when used alone, but when they form a ground for other enamels, they must be capable of resisting a high temperature without fusing.

Enamels are opaque or transparent; those which are used as a ground are opaque; those which are used in painting may be transparent or opaque; but the latter are usually preferred, especially for silver and copper. Enamelling on metal is more difficult than on glass. The presence of an oxydizable metal usually produces a reaction between the two bodies; the enamel dissolves the oxide which forms on the surface of the metal at a high temperature, and becomes coloured thereby; or the enamel may itself oxydize the metal, in consequence of the oxide of lead contained in it, in which case the lead is reduced, and the colour is destroyed. Hence gold admits of being enamelled better than copper or silver; but if gold contain copper, some difficulties may be experienced. On copper and silver, the enamel generally undergoes some change, at least in the layer which is in contact with the metal. If the enamel is transparent, the defect is apparent; but if opaque, and the surface smooth, the defects are concealed.

Copper and silver are sometimes first covered with an opaque enamel, and afterwards with one that is transparent.

The objects to be enamelled are usually prepared for the purpose by the jeweller. They may be entirely, or only partially covered with enamel, according to the design. In the one case there must be a protecting edge to retain the enamel, and in the other certain hollows, engraved according to the design.

All the enamels which are applied to metals have a vitreous, transparent, colourless base. The following are receipts for transparent enamels:

| | No. 1. | No. 2. | No. 3. | No. 4. | No. 5. |
|---|---|---|---|---|---|
| Silica ... | 3 parts | 3 parts | 3 parts | 10 parts | 3 parts |
| Minium | 3 | 4 | 5 | 15 | 6 |
| Nitre ... | 2·5 | 2 | 1 | 4 | 0 |
| Borax ... | 0 | 1 | 1 | 1 | 1 |

Opacity is given to enamels by the addition of a certain portion of—1, oxide of tin; 2, phosphate of lime, or, 3, oxide of antimony. The oxide of tin is first combined with the oxide of lead before the enamel is made. For this purpose, metallic lead and tin are fused together, and raised nearly to a red heat; the oxide which forms on the surface is removed as fast as it is formed; heat is again applied to render the oxide more complete. It is next stirred up in water, to precipitate the minute portions of metal which have escaped oxydation, and in this way the oxide can be separated.

The proportions of tin and lead which are to be thus fused together, vary according to the composition of the enamel into which these oxides enter. A quantity of oxide of tin, equal to about one-tenth of the weight of the enamel, will render it of an opaque white. The proportion of lead is variable, according to the kind of enamel required. For this purpose the following alloys will be found useful:

| | No. 1. | No. 2. | No. 3. | No. 4. | No. 5. |
|---|---|---|---|---|---|
| Lead ... | 3·5 parts | 5 parts | 6 parts | 6 parts | 7 parts |
| Tin ...... | 1 | 1 | 1 | 1 | 1 |

In the following receipts for opaque enamels, the oxide of one or other of these alloys is used instead of the oxide of lead in the transparent enamel:

| | No. 1. | No. 2. | No. 3. | No. 4. | No. 5. |
|---|---|---|---|---|---|
| Silica ... | 3 parts | 3 parts | 3 parts | 10 parts | 3 parts |
| Alloy ... | 4 | 5 | 6 | 18 | 7 |
| Nitre ... | 2·5 | 2 | 1 | 4 | 0 |
| Borax ... | 0 | 1 | 1 | 1 | 1 |

The above enamels are those adapted to gold The most fusible enamels required for copper and silver may be formed by the addition of one-eighth of their weight of calcined borax. By the further addition of this substance, the fusibility of enamels may be increased at pleasure.

Coloured enamels may be formed either opaque or transparent, by melting up with any of the above enamels a certain portion of some metallic oxide, as indicated in the following receipts:

| | | Parts. |
|---|---|---|
| Blue enamel | Opaque or transparent enamel | 10 |
| | Oxide of cobalt | 1 to 2 |
| Green enamel | Opaque or transparent enamel | 6 |
| | Oxide of chromium | 1 to 2 |
| Another green | Opaque or transparent enamel | 30 |
| | Binoxide of copper | 1 to 2 |
| Violet enamel | Opaque or transparent enamel | 30 |
| | Peroxide of manganese | 1 to 2 |
| Yellow enamel | Opaque or transparent enamel | 6 |
| | Chloride of silver | 1 to 2 |
| Purple enamel | Opaque or transparent enamel | 12 |
| | Purple of Cassius | 1 to 2 |
| Black enamel | Transparent enamel | 15 |
| | Oxide of copper, oxide of cobalt, and oxide of manganese, of each | 1 to 2 |

A further account of the methods of treating enamels in pottery and porcelain, will be found in the very able work by Charles Tomlinson, entitled "Cyclopædia of Useful Arts," from which the receipts given above are taken.

## PHOTOGRAPHIC SOCIETY.

A NUMEROUS meeting of photographers, artists, and others interested in the progress of photographic art, was held in the Meeting-room of the Society of Arts, on Thursday, the 20th, to take into consideration the formation of a Photographic Society for the encouragement and development of this very beautiful branch of the fine arts; Sir Charles Eastlake, President of the Royal Academy, in the chair.

Mr. Roger Fenton read a brief report of the "Photographic Committee," setting forth the present position of photography and its future prospects, and concluding with the statement, that in the opinion of the Committee, a Photographic Society would be a valuable and useful institution, and that its formation would tend materially to promote the advancement of the art.

It was then moved by Sir William Newton, and seconded by Mr. R. Hunt, "That a society be now formed, to be called the Photographic Society."

Mr. PETER LE NEVE FOSTER said, that he had been deputed, with Dr. Playfair and Dr. Booth, by the Council of the Society of Arts, to bring the following resolutions, passed at a recent meeting of the Council, as suggestions, before the meeting.

1st. "Feeling strongly convinced that the various branches of science and art are, to a very great extent, dependant upon, and intimately connected with each other, and that the multiplication of societies for special objects, in any branch of the applied sciences, is not generally desirable, inasmuch as it tends to separate, rather than unite, for the advancement of a special object, the labours of individuals; and finding that steps are being taken by several of the leading photographers for the formation of a Photographic Society; the Council of the Society of Arts are of opinion that the objects contemplated by that proposed Society are intimately connected with those which for many years past have received the especial attention of the Society of Arts; and that, therefore, it is desirable to suggest to the gentlemen engaged in this direction, whether the progress of photography may not be as effectually advanced by means of the existing machinery of the Society of Arts."

2nd. "That in the event of this suggestion being adopted, the Council will be cordially prepared to devote funds, rooms, officers, and publications, with such other facilities as may be necessary for the full development of photographic art, by the organization of a special department, under the direction of a photographic committee."

The suggestion thus made did not, however, seem to meet the wishes of the majority of the meeting, who evidently considered that the progress of the art would be best secured by the formation of a special society.

Mr. Fenton then read the proposed rules of the new society, which were adopted. A Council were chosen. Sir Charles Eastlake was elected President, Mr. Roger Fenton, Honorary Secretary, and a considerable number of members were enrolled.

## PROMOTION OF ELEMENTARY DRAWING.

THE following Circular, showing how Public Schools and Mechanics Institutes may obtain of the Department of Practical Art examples for acquiring an elementary knowledge of form and colour, and of what the examples consist, has just been issued by the Department, and will be found to have an interest for the Institutions in union with the Society:

List of the Examples, &c., which may be obtained from the Department by National and other Public Schools, and Mechanics' Institutes, at half the prime cost.

The Lords of the Committee of Privy Council for Trade having had under their consideration several applications from the managers and masters of National and other Public Schools for grants to be made to them of drawing copies, and examples used by the Department of Practical Art, in teaching elementary drawing, think it necessary to adopt some general principle which shall regulate the decisions of the Board in reference to such applications.

My Lords already have fully recognized the great importance of elementary drawing to all classes of the community, in all relations of life, and have expressed their opinion that the first step to be taken to elevate public taste in the appreciation of correctness of form, is to cause drawing to become a part of national education. Their Lordships are therefore desirous that the Department of Practical Art should assist, as far as possible, in promoting the distribution of the means of accomplishing this object; but as the indiscriminate gift of examples to all applicants might lead to abuse, it is necessary to require some guarantee that the examples will be duly appreciated, which the mere request to have them does not imply.

The principle which governs the whole proceedings of the Department, in all its branches, is to afford partial aid; and to encourage, but not supersede, public exertions in promoting education in art. Thus the means of study in the Museum of Ornamental Manufactures are afforded, lectures are given, and students are enabled to obtain the best instruction in all the schools by payment of low fees in aid of the expenses; and my Lords consider that the same principle should be observed in the distribution of examples. They have therefore resolved that the Department shall have the power to assist schools with examples for teaching drawing upon the condition that the applicants are willing to pay half the prime cost of them. By this means, when a school is willing to subscribe 1*l.*, the Department will furnish examples of the value of 2*l.*, and so on, as far as the Parliamentary Grant will permit.

A List of the examples of drawing copies, models, casts, and materials, which the Department will be prepared to furnish on these terms, may be obtained of the Secretary of the Department of Practical Art, Marlborough-house, London. It should be distinctly understood, that the privilege of purchase can be obtained only by Public and not Private Schools, and Institutions, and not by individuals.

It is desirable that every Public School, &c., should possess ALL the three following Collections of Examples, &c., if they can be afforded. If this be not possible, then it is recommended that they be procured in the order 1, 2, 3; any one of the three Collections may be obtained, but *Portions of a Collection cannot be procured of the Department*. Application for portions should be made to Messrs. Chapman and Hall, 193, Piccadilly, London.

### COLLECTION I,

Which may be procured of the Department by any Public School for twenty-seven shillings, being half the prime cost to the Department. If a further supply is required for the same School, then the full cost to the Department will be charged.

1. A black board. 2. Six brass holders for Chalk. 3. Wooden compasses, and white chalk. 4. Slip and two set squares. 5. T. square. 6. A set of each of the letters A O S, mounted. 7. A set of twelve outlines on black and white grounds, mounted. 8. A set of twelve plates of outlines for the black board, mounted. 9. A large diagram of colour, mounted. 10. A small diagram of colour, mounted. 11. A manual and catechism on colour. 12. Definitions of plane Geometry, by Mr. Burchett. 13. Two colour-boxes. 14. Two cases of Instruments. 15. Catalogue of the articles in the Museum at Marlborough-house, with six prospectuses of the Department. 16. Addresses of the Superintendents on Elementary Drawing. 17. Addresses of the Superintendents on the Facilities afforded by the Department for acquiring Art—Education. 18. Five Placards of the Principles of Decorative Art.

### COLLECTION II,

Which may be procured of the Department by any Public School for 4*l*.; being half the prime cost to the Department. If a further supply is required for the same School, then the full cost to the Department will be charged.

1. A stand with a universal joint, to show the solid models, &c. 2. One wire quadrangle with a circle within it, and one straight wire; one solid cube; one skeleton cube; one sphere; one cone; one cylinder; one hexagonal prism. 3. The Elementary work on Practical Geometry, 12 inches by 17 inches; diagrams opposite the text. 4. The Elementary work on Practical Perspective, 12 inches by 17 inches; diagrams opposite the text. 5. The Drawing-Book of Elementary Outlines of Ornament, by Mr. Dyce, 75 plates mounted and "Kalsomined,"—that is, the surface may be washed. 6. A set of the fifteen first plates of the Elementary work on Practical Geometry (same as No. 3), mounted and "Kalsomined." 7. A set of twenty-six plates of Practical Perspective. 8. Three objects of *form* in Pottery; *Minton's Bottle*, No. 508; *Indian Jar*, 487; *Celadon Jar*, 489.

### COLLECTION III,

Which may be procured of the Department by any Public School for 2*l*. 10*s*.; being half the prime cost to the Department. If a further supply is required for the same School, then the full cost to the Department will be charged.

1. One set of Outlines of Ornament, by Mr. Herman, 12 plates mounted and "Kalsomined,"—that is, the surface may be washed. 2. One set of Outlines of the Human Figure, by Mr. Herman, 20 plates mounted, &c. 3. Four Outlines of Tarsia, from Gruner, mounted, &c. 4. One set of examples of ornament shaded, 4 plates, mounted, &c.: Antique Scroll, Greek Honeysuckle, Frieze from Ghiberti Gates, Renaissance Rosette. 5. Shaded examples of Biga, or Ancient Car, from Gruner, mounted, &c. 6. Six coloured examples of Flowers, mounted and "Kalsomined:" Pelargonium, Petunia, Nasturtium, Camellia, Wall-Flower, Althœa Frutex. 7. Three selected Vases in Earthenware (Wedgwood's, No. 176, 882, 940.) 8. Three selected pateræ. 9. Three selected pieces of ornament in relief. 10. Three large shells, such as *Dolium Chinense*, *Murex colosseus*, *Pecten opercularis*. 11. Three other selected shells, such as the *Haliotis Virginea*, *Cassis Rufa*, *Cassis Glauca*. 12. Three selected stuffed birds, as examples of colour, such as *Crimson Tanager*, *Orange Oriole*, and *Blue Mountain Parroquet with extended wings*. 13. One copy of Redgrave's Report on the "Design" of Articles exhibited in the Great Exhibition of 1851, half-bound.

WALTER RUDING DEVERELL, *Secretary*.

*January*, 1853.

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The following new Rules have recently been sanctioned by the Board of Trade, for the management of the Metropolitan Female School, at 37, Gower-street. Students before entering the Elementary School must be able to draw the copies of the letters A. O. and S., which may be obtained at the School, and they must also have a knowledge of the names of certain geometrical forms which are contained in a Text-book of definitions of Practical Geometry, to be obtained at the Female School; and no student will be admitted without examination upon such book. Every student desirous of entering the upper school must make drawings from the most advanced examples in the Elementary School, and have a knowledge of the elementary laws of colour,—a Text-book of the Laws of Colour may be obtained at the school, on which every applicant for admission to the upper school will be examined. The new *Fees* are as follow:—General Course; Entrance-Fee, Two Shillings. *Elementary Classes*, Three Shillings a Month,—Seven Shillings for Three Months, and Ten Shillings for Six Months. *Advanced Classes*, Four Shillings a Month, Nine Shillings for Three Months, Twelve Shillings for Six Months; Course for the *Figure and Artistic Anatomy*, Four Guineas a Year, or Thirty Shillings a Quarter

The Classes meet in the day; but an Evening Class for those who cannot attend in the day is to be forthwith established.

## HOME CORRESPONDENCE.

### OUTLINE DRAWING.

90, George Street, Edinburgh, 10th, Jan., 1853.

SIR,—In your seventh number, you make some remarks on the Fine Art section of the premium list regarding outline, and the ideas by which you illustrate them, appear to me to coincide so exactly with those I advanced about nine years ago, with reference to the useful art of ornamental design, that I take the liberty of addressing you upon the subject.

It will be seen from your advertising columns, that one of my works is "*An attempt to develop and elucidate the True Principles of ornamental design*," and that another is a similar attempt to develop the "*First Principles of symmetrical beauty*."

In the first of these two works, which was published in 1844, I insist upon the necessity and advantage of cultivating the knowledge and practice of outline in these words. "The outline is what constitutes the figure of the ornament, and the impression of beauty or deformity is conveyed to the understanding as effectually by this line, when it inscribes a plain figure, as when it surrounds a solid body; for no object in nature can depict any thing upon the retina of the eye but a plain figure; and it is only by experience that we become aware of any object having other dimensions than length and breadth. Hence, as every solid form is but the fluent of a plain figure, the eye, or rather the perceptive faculty through the eye, may be so far deceived by an imitation of light and shadow, within the outline of such a figure, as to mistake it for a solid body; but it never can be mistaken in regard to its configuration" (which configuration, or contour, the outline only determines). "The combination of plain figures produced by lines is, therefore, suceptible of every modification of the harmony of form, independently of light and shadow." And it is consequently treated in the essay in question accordingly. Thus our ideas are identical in respect to the important nature of a true outline, and its value as an element in art.

I have observed, and now think it time, in justice to myself, to state the fact, that, notwithstanding the numerous lectures and essays upon the true principles of ornamental design, to which the Great Exhibition of 1851 has given rise, nothing on that subject has been expounded beyond what is to be found in the two works to which I have alluded, where these principles are not treated of in words alone, but are illustrated in the most ample manner. I do not, by this statement, assume that there has been any plagiarism from my works on the part of the Lecturers or Essayists, but simply to show that the Great Exhibition, having opened the eyes of its promoters to the general deficiency in this kind of knowledge, so many now prosecute the inquiry that the truth must now and then come out.

My two works on the subject, however, appeared at a time when they could not be understood by those who directed our schools of design, nor relished by the teachers who then thought, as some still continue to think, that it is equally below the dignity of their genius, or the art in which it is developed, to be in any way trammelled by rules. These books, therefore, were not countenanced by the generality of artists; and not belonging to that popular class of literary works which conduces more to the amusement than the improvement of mankind, could not meet with the same degree of notice from the public press. Yet these humble efforts of mine were honoured with highly favourable notice in two metropolitan Journals, of the highest class, namely, the *Spectator*, and the *Athenæum*.

The insertion of this letter would greatly oblige me, and I think it would be usefully interesting to that numerous class of your readers who are in search of the true principles of design.

I am, Sir,
Your most obedient Servant,
D. R. HAY.

## LECTURES.

——— Mechanics' Institution,
Jan. 12th, 1853.

SIR,—The subject of Lectures and Lecturers for the Associated Institutions, which I see has been discussed in the Journal of the Society of Arts, of the 7th January, is one of great importance. This Institution, like some other country ones, was unable to undertake the risk of bringing the Society's Lecturers from London, seeing that hitherto the lectures we have had have been of a gratuitous character (excepting the mere expenses of lectures), and a fixed charge for admission, of a sufficient amount to pay the fees and expenses of gentlemen from London, would only have the effect of keeping away the major part of our audiences, who cannot afford such sums, and, if they could, have not yet interest in public lectures sufficient to induce such outlay; for in small towns, the *Mechanic* element constitutes the bulk of our audiences, and such our Institutions purpose chiefly to benefit in their operations; for, though in many cases, from their indifference to these matters, and preference of grosser amusements, *Mechanics'* Institutions have fallen into the hands of the middle classes, yet they are primarily designed for the operative portion of the community, and in all our arrangements for the proper conduct of our societies, this fact should always be kept prominently in view, both in the instruction given by books and lectures, and in the sum charged for these, so that mechanics may, at least, have it in their power to avail themselves of the benefits of our Institutions; for without this all our efforts are a mere mockery, and we place the workman, like Tantalus, up to the chin in the element of knowledge, but forbid him to taste of its blessings.

To conclude, I most cordially agree with the suggestions of "J. S." in your Journal, as to the Society of Arts forming and endowing a staff of lecturers, to be sent, according to a fixed plan, to the Institutions in Union, without any cost to them beyond that included in their annual subscription to the Central Society in London, which of course would require to be increased a little in amount, but yet not to any very large sum, seeing that if this was paid by *every* Institution, a large sum would thereby be raised, and enable the Central Committee to do this desirable work very effectively. I do most earnestly hope that this matter may be taken into serious consideration, so that all the associated societies may receive some tangible benefit from their union with so potent an institution as the Society of Arts.

I am, Sir, your obedient servant,
DELTA.

## MEASUREMENT OF TONNAGE.

Parkstone, Poole, Jan. 24th, 1853.

SIR,—Your correspondent, Mr. Roberts, is in error when he states, that in the old system of measurement for register tonnage the element of depth is not taken into account. One of the items of the old measurement includes the number of feet between the wing transome and the upper edge of the keel. But both the old and the new regulations for ascertaining the register tonnage of sea-going vessels, are utterly at variance with progress in the form of a ship's hull. They are arbitrary rules giving false results, even when shipwrights adhere to a certain fashion or custom; but when any change takes place, the error of these rules amounts to an absurdity; in fact, the tonnage might almost with equal propriety be calculated from the name of the vessel.

A merchantman, for instance, will often carry considerably more than half as much again as her registered tonnage amounts to, while a vessel calculated for sailing only as a yacht, will carry no tonnage at all, being fully loaded with her ballast and equipment. For the yacht-building community have quite as great an object in view—that of defrauding or evading the regulations of the yacht clubs—as the shipowners have in defrauding the revenue.

In short, all arbitrary rules for ascertaining the register tonnage other than the actual burden she can carry, are an effectual bar to all progress in ship-building,—that is, in the production of vessels equally calculated for sailing and carrying. Let any person take an end view of a tier of merchantmen in harbour, and he will readily perceive that they are all without exception *wall-sided;* that is to say, that nearly four-fifths of the ship's side is nearly as flat as the wall of a garden, from which similarity the term *wall-sided* is derived.

Mr. Roberts is also in error when he attributes the bad form of our merchantmen to the desire of shipowners to underman their vessels—the great object being to reduce the tonnage dues to a minimum in relation to the actual burden a ship can carry—in other words, to defraud the revenue to an enormous extent.

The time is surely arrived when the voice of the nation should be heard, and that in obedience to the dictates of common sense and honesty, the registered tonnage of a ship shall be the actual weight she can carry when sunk to her load water-line, and in proper sea-going trim. Our shipping might then be the first in the world, as well for speed as for carrying powers; for our shipwrights are inferior to none in skill and capabilities, only under the present incubus of the absurd tonnage laws their talents are directed to a false, not to say a fraudulent end. Neither is there any insurmountable difficulty in the way, as is amply proved by the fact, that every experienced shipwright will undertake to build a vessel of a certain specified registered tonnage; and further that she shall carry so many specified tons over and above such register tonnage.

HENRY W. REVELEY.

## RESIN OIL.

SIR,—As a Member, and one who takes a warm interest in the objects for which the Society of Arts was founded, I forward for insertion in your journal the particulars of a new process which I have discovered, for removing from resin oil its present noxious odour, which so much prevents its application in numerous instances, where from its cheapness it might be employed with great advantage.

My process consists in placing 100 gallons of the oil in a copper pan, or, what is better, in a pan of glazed iron, and adding thereto by degrees, 35lbs of sulphuric acid of a specific gravity of 1.845: the whole is then well stirred, and gently heated to a temperature of 300°. During this operation large quantities of gas and vapour are given off, the production of which is greatly facilitated by agitating the mass. The fumes having nearly ceased to arise, the whole is allowed to cool, and a clear brown liquor is decanted from a thick carbonaceous mass which adheres to the bottom of the vessel; and it is distilled in the ordinary way. A copper still is preferred to an iron one for this operation, as it is less acted upon by the small quantity of vitriol which remains in the oil. With the exception of the first and last products of distillation, the whole of the bulk of the oil distilled is nearly white, and it only requires to be heated at a low temperature, or by passing through it a jet of steam to obtain the resin oil, deprived, or nearly so, of any odour.

There is a simple contrivance which can be adopted to prevent by any chance the slight amount of acid which remains in the oil from acting upon the still; it consists in suspending in the centre of the still containing the oil, a basket filled with chalk, which neutralises, as the oil is set in motion by currents, any acid it may have retained.

The advantages of obtaining this cheap oil free from odour, and enabling it to be applied to various purposes from which it is now excluded will, I believe, more than cover the slight expense of the above process, and the loss of 10 per cent. of the oil experienced in the working.

F. C. CALVERT.

## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ROYAL SCOTTISH SOCIETY OF ARTS.—The Society met in their Hall, 51, George-street, Edinburgh, on Monday 10th January; D. Stevenson, Esq., F.R.S.E., President, in the chair. The first paper read was by Mr. John Campbell, "On the Principles of Ascent from the Centre of Gravity." This was merely preliminary to another by the same author, "On the Cause of Upright Movement or Ascent for the Centre of Gravity, illustrated by the Antilunar Line." Mr. Campbell stated that the theory of the tides formed no part of the Newtonian philosophy. That which was now established in the British schools was contained in a paper written by Professor John M'Laurin, whose theory was, that the lunar tide was caused by the waters being drawn by the moon's attraction from the earth, and the antilunar tide by the earth being drawn from the waters. There was no difficulty as to the lunar tide; all were agreed that the moon attracted the earth; and as attraction increased and diminished inversely as the squares of the distance, the waters at the equator were more attracted than the waters at the centre and the poles, and, therefore, they rose into a tide. With regard to the antilunar tide, Mr. M'Laurin stated, that in consequence of the increasing distances between the moon and the lunar and antilunar equator, the earth would form a spheroid, whose longest axis would be in the line of the moon. For this theory the author proposed to substitute the following—that the lunar tide was produced by the waters nearest the moon being more attracted at the equator than at the poles, and the antilunar tide, by the waters at the poles being more attracted than those at the equator, and being resisted by the beds on which they rested, those that were most attracted displaced those that were least attracted, and compelled them to ascend and accumulate into a tide. The next paper was a "Description of a Self-acting Railway Signal," by Mr. Carrick. This signal consisted of a hollow cast iron column, in which a pendulum worked. This pendulum was set in motion by a lever acted upon the locomotive. Near the top of the column there was an orifice which could be obscured by a disc in the day time, and at night, by means of lamps and reflectors, could be made to give similar signals. The disc and the lamp were acted upon by the pendulum, and by the extent of its vibration the distance a-head of any train could be ascertained.

ZOOLOGICAL SOCIETY, Jan. 25th.—Dr. Gray, Vice-president in the chair. The Secretary read a letter from Mr. L. Fraser, H. M. Vice-Consul at Whidah, written from Clarence, Fernando Po, and addressed to Mr. Cuming. It contained some notice of the existence of a large Quadrumanous animal in the interior, called by the natives *Tap-par-po-har*, which is supposed by them to be a Chimpanzee, but which is considered by Mr. Fraser to be most probably a *Cynocephalus*. Mr. Fraser has not yet succeeded in obtaining a specimen. He describes two new birds obtained in June and July last at Fernando Po, under the names of *Bubo poensis*, and

*Buceros poensis.*—M. Deshayes read a paper on the animals of *Camostrea*, *Clementia*, and *Glauconome*, and in the course of it he took occasion to describe fourteen new species of the genus *Mactra* and two of *Clementia.*—Dr. Gray read a paper on the division of *Stenobranchiate Gasteropodous Mollusca*, in which he made use of the character afforded by the mouth, which he considers establishes the distinction of two great groups in a much more natural manner than the presence or absence of a syphon in the mouth, and to be more consistent with the habits of the animals, and much less liable to exceptions. The character upon which Dr. Gray chiefly relies is the form, disposition, and number of the teeth on the lingual membrane. M. Deshayes made some observations upon the manner in which the animals of these groups take their prey.

INSTITUTION OF CIVIL ENGINEERS.—Jan. 25th, J. M. Rendel, Esq., President, in the chair. The paper read was, "On the Construction of Fire-proof Buildings," by Mr. J. Barrett. Before proceeding to the immediate object of the paper, the author introduced some remarks on the use of timber for building purposes, and then referred to the iron-girder and brick-arch system of construction. The system recommended by the author consisted in the use of joists of wrought, or rolled iron, of an improved form, combining lightness with great strength and economy; and by the employment of layers of incombustible materials, chiefly concrete, supported by, and consolidated with, the joists, a strong and solid fire-proof foundation was obtained, upon which any description of finished surface, adapted for a floor, or roof, might be laid. This system, (with certain modifications in detail), had been applied at Guy's Hospital, King's College Hospital, the Training College at Chelsea, and the Flax-Mills, at Newry. From a comparison of the cost of different floors, it appeared that the fire-proof foundation, finished with the ordinary boarded surface, was, on the average, very little, if at all, more expensive than common timber floors.

## PROCEEDINGS OF INSTITUTIONS.

CARLISLE.—On Tuesday last, M. J. Rae, Esq., D.D., delivered a Lecture on "Mind and its Culture" to the members of the Mechanics' Institute. The lecturer commenced by recounting several of the various opinions entertained by ancient and modern philosophers regarding the seat of the mind. He refuted the ordinary materialist opinion regarding the non-existence of mind; and showed that it could not be the result of the mere organization of the brain, nor yet an immaterial essence only, as maintained by Priestley and the more refined materialist philosophers; and that nothing but an immaterial and spiritual essence would suffice to account for the phenomena of mind. Dr. Rae next proceeded to point out the advantages of the study of mental philosophy to individuals, and concluded by glancing briefly at its effects on legislation, science, literature, and religion.

CHICHESTER.—On Wednesday, the 12th instant, a Lecture was delivered before the members of the Literary Society and Mechanics' Institute "On Burlesque," by Mr. C. Charles. The lecturer pointed out the uses and abuses of burlesque; and after alluding to the superficial resemblance sometimes presented by the sublime and the burlesque, proceeded to show that Shakspere's quibbles were not always gratuitous, or jocular; closer attention often revealing a deeper purpose, generally enhanced by the epigrammatic guise, and cited some instances exemplifying his remarks. He represented that the true suffers nothing from burlesque: while to the false, burlesque is fatal; and that it was not confined to literature and the stage, but examples of it might be found among the sculptured adornments of our metropolis, and the grotesque carvings in many of our cathedrals. He also remarked upon the equivocal nature of written communication, and the superiority of oral. The lecturer accompanied his observations with characteristic and humorous illustrations from Shakspere, Ingoldsby, Hood, Planché, &c.

EXETER.—The Annual General Meeting of the members of the Literary Society took place on Friday, the 14th instant, in the Lecture-room, Athenæum; R. Dymond, jun., Esq., in the chair. The Report of the Committee was read by Mr. R. C. Halse, Secretary. It gave a detailed report of the proceedings of the Society during the past year; the latter portion of which had shown a great increase in the numbers, now amounting to 605. The Lectures, Library-classes, &c., had received vigilant attention, fully proving that, while the tastes of the members had been gratified with the pleasing departments of literature, music, &c., the more serious departments of educational and scientific knowledge had been fully cared for. The Report stated that, "It will be remembered that a few years since some of the members of this Society were mainly instrumental in establishing a Union of the various Literary Institutions of the West of England, with a view of enabling them to co-operate to their mutual advantage, more especially in the engagement of Lecturers, and the interchange of friendly communications and useful suggestions. Within the past twelve months the principles on which the Western Literary and Scientific Union was founded have been recognised by the Society of Arts,—one of the oldest and most valuable of the metropolitan Institutions. This Society suggested the formation of a central Union almost identical in character with that which existed in our own locality; and the Council of the latter, after maturely considering the plans of the Society of Arts, resolved to withdraw from their own less extensive sphere of operation and to recommend the Institutions comprising the Union to form a similar connection with that established by the Society of Arts." John Sillifant, Esq., was re-elected President. The Vice-presidents chosen were M. Kennaway, Esq., J. Daw, Esq., T. Latimer, Esq., R. W. Fox, Esq., R. Dymond, jun., Esq., A. P. Jarvis, Esq., S. Davies, Esq., and Mr. Treleaven. The following were elected members of the Committee for the ensuing year:—Messrs. Clarke, Glenn, Treleaven, Wilson, Burne, Jennings, Willis, Jarvis, R. Dymond, jun., Bailey, J. J. Dymond, Channon, Gould, Hill, Davies, Milne, Pope, O. A. Fox; and Messrs. J. J. Dymond, R. C. Halse, and J. T. Tucker, were respectively re-elected Treasurer, Secretary, and Librarian.

SOUTHAMPTON.—An admirable lecture on "The Life and Character of William Penn," was delivered by the Rev. J. W. Wyld to the members of the Polytechnic Institution, on Wednesday evening. The rev. gentleman gave a faithful sketch of the parentage, early prospects, life, and death of this extraordinary man, delineating the leading features of his remarkable career, and the great and noble principles by which his conduct was guided, in a masterly style. The lecture throughout was replete with instruction of the highest order, an obedience to the dictates of conscience, which formed the leading characteristic of Penn's valuable and useful life, being enforced upon his auditory with great power and eloquence.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

B. B. (*Loughborough*).—The "Report of the Juries on the Great Exhibition" is published at a price of £1 1*s.*

A neat Case, for holding the Numbers of the Journal for half a year, is now ready, and may be had of the Publisher, 186, Fleet-street, price 1s. 8d.

## QUESTIONS FROM CORRESPONDENTS.

*Printers' Types.*—What are the practical difficulties which stand in the way of employing machinery in the manufacture of ordinary printers' types in place of the present process of casting by hand. (No. 27.)

*Book Indexing.*—Are there any objections to colouring the edges of thick books, such as the *London Directory*, so as to facilitate reference to each particular section; or could not the name of the Directory, say, Street Directory, be printed on the edges of the leaves after binding. (No. 28.)

## MISCELLANEA.

Sluice Valves.—Mr. Jennings has recently patented an improvement in sluice valves, which consists in simplifying the construction by casting the "body" and the "faucit" ends in one piece, thus avoiding the use of bolts, nuts, and joints. The sluice is first fitted and made to work properly on the body of the valve; it is then removed, and, with two gun-metal faces, is turned, around, and accurately fitted. The slide, through which a small hole has been previously drilled, is again placed on the valve, the two faces are introduced, and all firmly bolted together. The joints of the faces, which are dovetailed to the body, are then made with lead, or with iron cement; the bolt is removed, the hole plugged, and the valve is completed, at considerable saving of time and cost. These valves are stated to have been extensively used under considerable pressures.

Communication between the Guard and the Engine Driver of a Railway Train.—Whilst other companies are considering what plans to adopt for accomplishing this object, the Brighton Company have, it is said, taken the initiative step, by applying to their express trains a simple contrivance which has been found to answer perfectly on many continental lines. This consists of a bell fixed near the engine driver, to which a line is attached, passing along the tops of the carriages, until it reaches the guard's van. The connection from carriage to carriage is made by an ordinary swivel fastening. Being placed outside the carriages it is not readily accessible to the passengers, so that one ground of objection is removed. At the same time, should any urgent necessity arise, it is perfectly possible for a passenger, by passing along the foot board to the space between the carriages, to reach the line, and so make the desired communication.

Life Boat.—Mr. G. F. Parratt proposes to apply to an ordinary boat, Mackintosh air-chambers, which, when not in use, lie against the sides. They are attached at their upper edges to an elastic line, to which a netting is also fastened. When required for use, a loose spar is fitted transversely amidships, round the ends of which the elastic line, with the pendant air-chambers, is passed, so as to form the two sides of a triangle, the sides of the boat facing the base. The plane of the triangle is occupied by the netting before alluded to; and thus an extended surface is obtained, on to which persons might jump, the netting being in a certain degree yielding, breaking the fall.

Dublin Exhibition.—At the Meeting of the Institution of Civil Engineers, on Tuesday last, Mr. Roney said that the Dublin Exhibition was progressing most favourably, and much beyond what was first anticipated. As a proof of this it might be stated, that the original size of the building would be nearly doubled; and that to meet the additional outlay, Mr. Dargan had increased his donation from 20,000*l.* to 50,000*l.* It was believed that the department of machinery in motion would be quite as interesting and attractive as that in the Great Exhibition. Mention was also made of the Society of Arts having determined that their East Indian Exhibition, and all the influence of their body, should be transferred to Dublin. There would also be a mediæval court, and an Archæological Collection, which would show that Ireland, though of late years not progressing so rapidly as this country, was, in former times, a country possessing high attributes of civilisation. There would likewise be a fine collection of pictures of every school. Mr. Roney concluded by soliciting the members to aid the Exhibition by the loan of models, whether working or stationary, and of works of art, of all of which great care would be taken.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette*, 21*st Jan.*, 1853.

*Dated 1st Jan.*, 1853.

8. J. H. Johnson—Improvements in the manufacture of oils. (A communication.)

*Dated 3rd Jan.*

12. E. A. Chameroy—Motive power.
18. C. J. Burnett—Driving machinery by water.

*Dated 6th Jan.*

31. W. L. Sheringham—Illuminating buoys and beacons.
33. J. Browne—Construction of ships, &c.
37. M. Smith—Separating gold from other materials.
39. W. E. Newton—Bearings for shafts, turntables, &c., called Parry's Improvements. (A communication.)
41. P. Graham—Carpets and piled fabrics.
42. W. S. Ward—A thermostat for temperature and ventilation.
43. W. Watson—Apparatus for manufacture of prussiate of potash.

*Dated 7th Jan.*

44. C. de Bergue—Permanent way.
45. T. Pape—Circular frames, and fabrics produced thereby.
47. C. W. Lancaster—An appendage to bullet-moulds.
48. G. Stewart—Railways and propulsion of engines.
49. H. G. James—Retaining corks and stoppers in bottles.
50. R. Gittins—Improvements in tills.
51. H. Marshall—Transmission and emission of air and sound.
52. J. E. A. Gwynne—Propulsion of vessels. (A communication.)

*Dated 8th Jan.*

53. R. Lovely—Steam to propulsion of carriages on common roads.
54. T. Smith—Soil-pans.
55. J. Abraham—Percussion-caps.
56. H. Kibble—Communication between guards and drivers.
58. J. H. Johnson—Stoves for cooking. (A communication.)
60. R. Walker—Manufacture of buttons.

*Dated 10th Jan.*

61. A. Hiron—Copying figures in marble, &c.
62. C. S. Duncan—Rendering jars, bottles, &c., air and water-tight, and raising and measuring the liquid contents thereof.
63. J. Deane—Diving-helmet.
64. M. Fitch—Improvements in ovens.
65. W. Webb—Manufacture of carpets.
66. J. D. M. Stirling—Percussion-caps.
67. F. Schneider—A chair for preventing sea-sickness.
68. A. V. Newton—Separating substances of different specific gravities.

*Dated 11th Jan.*

70. W. Weild—Looms for weaving.
72. J. and J. Thornton—Improved nets and other textile fabrics for gloves, &c., and the machinery for the same.
74. T. Cottrill—Manufacture of salts of soda.

*Dated 12th Jan.*

76. J. Horrocks—Registering passengers in public carriages.
78. N. Card—Improvements in candlewick.
82. J. Arrowsmith—Machinery for shaping metals.
84. G. A. Huddart—Steam generators.

*From Gazette, 23rd Jan.*, 1853.

NONE.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 20th Jan.*, 1853.

857. John Gedge, of 4, Wellington-street, Strand—Improvements in the mechanism of looms for weaving.

*Sealed 21st Jan.*

17. Charles Henry Newton, of 192, Camden-road Villas, and George Ludham Fuller, of Peckham—Improvements in protecting electric telegraph wires.
113. Richard Harczyk, of St. Mark-street, Tenter-ground, Goodman's-fields—Improved preparation or composition of colouring matter, to be used in washing or bleaching linen and other washable fabrics, and in the manufacture of paper and other substances.
453. Frederick Richards Robinson, of Charlestown, Massachusetts, U. S.—Improvement in the gridiron, or instrument for cooking steak and other articles by broiling.
489. Peter Armand, Le Comté de Fontaine Moreau, of 4, South-street, Finsbury—Improvements in apparatus for essaying silk, cotton, and other similar fibrous substances.
528. Halsey Draper Walcott, of Boston, Massachusetts, U. S. —Improved mechanism or contrivance for cutting button-holes or slits in cloth or other material.
632. Nehemiah Hodge, of N. Adams, Massachusetts, U. S.—Invention for discharging water from the hold of a vessel.
654. Richard Wright, of Greenwich—Improvements in shafts and plummer-blocks.
677. Andrew Robeson, jun., of Newport, Rhode Island, U. S, —Improved mode of bowking or bucking cloth.
712. Christian Sharps, of Hartford, Connecticut, U. S.—Improvements in breach-loading fire-arms.
759. Abraham Rogers, of Field House, near Bradford, Yorkshire—Improvements in apparatus used for forming sewers, tunnels, and ways.
787. Moses Poole, of Serle-street—Improvements in the manufacture of seamless garments and other seamless fabrics. (A communication.)
789. George Perry Tewkesbury, of Boston, Massachusetts, U. S.—Improved life-preserving seat.
791. Richard Kemsley Day, of White Cottage, Plaistow—Improvements in the manufacture of fuel for lighting fires.
794. Moses Poole, of Serle-street—Improvements in cementing matters in the production of ornamental and other forms and surfaces. (A communication.)
817. John Pepper, jun., of Portsmouth, New Hampshire, U. S.—Improved machine for knitting ribbed work.
820. Samuel Hunter, of 13, Ravensworth-terrace, Gateshead—Improvements in anchors.
854. Edward Aitchison, Lieutenant in the Royal Navy, of 14, Manor-street, Chelsea, and John Evans, of 8, Hamilton-st., Wandsworth-road—Improvements in furnaces.
862. Henry Holland, of Birmingham—Improvements in the manufacture of umbrellas and parasols.
867. Charles Iles, of Birmingham — Improvements in the manufacture of chimney-pieces.
881. Henry Bollmann Condy, of Battersea—Improvements in the manufacture of acetic acid and acetates.
883. William Massingham, of Ipswich—Improvements in carriages and apparatus for carrying the dead.
897. George Houghton, of 74, High-street, Birmingham—Improvements in the manufacture of college caps.
913. James Murdoch, of Staple Inn—Improved materials for use in painting. (A communication.)
939. James Newall, of Bury, Lancaster—Improvements in breaks, machinery, or apparatus applied to railway and other carriages in motion, and in the mode or method of connecting two or more of such breaks together.

*Sealed 22nd Jan.*

75. Laurentius Mathias Eiler, of Denmark, now residing at Leadenhall-street—Apparatus to release or separate carriages on railroads in case of accident, giving at the same time a signal of distress.
86. David Dunne Kyle, of 120, Albany-street, Regent's-park —Improved method of excavating and removing earth.
232. John Prestwich the elder, Samuel Prestwich, and John Prestwich the younger, of Tamworth, near Bolton, Lancaster—Improvements in machinery or apparatus for cleaning and finishing woven fabrics.
412. John Howard, of Bolton, Lancaster—Improvements in the construction of steam-boilers or steam generators.
451. Robert Brown, of Manchester—Improvements in the method of ventilating buildings or apartments, and in the apparatus connected therewith.
486. Robert Burns and Richard Pritchard Walett, of Liverpool —Improvements in machinery or apparatus for cutting bones.
660. James Nichol, of Edinburgh—Improvements in the process of graining or ornamenting surfaces and fabrics.
729. Thomas Day, of Upper Mall, Hammersmith—Improvements in landing and screening coals, and delivering them into sacks.
742. Hugh Greaves, of Salford, near Manchester—Improvements in the permanent way of railways.
886. Edward Lewis Brundage, of Jewin-crescent—Improvements in apparatus for drawing off fluids from animal bodies. (A communication.)
894. William Joseph Curtis, of Grafton-place, Euston-square—Improvements in the formation of tramroads or railroads, and carriages that run thereon.
938. Charles Millar, of Dundee—Improvements in timekeepers, or clockwork, and in machinery or apparatus worked in connection therewith.

*Sealed 24th Jan.*

565. William Henry Fox Talbot, of Lacock Abbey, Wiltshire—Improvements in the art of engraving.
568. Richard Archibald Brooman, of 166, Fleet-street—Improvements in tackle-blocks.
601. Julius Jeffreys, of Croydon—Improvements in obtaining power when steam or other vapour is used.
617. John Macintosh, of Aberdeen—Improvements in the manufacture of paper.
619. George Fergusson Wilson, of Belmont, Vauxhall—Improvements in the preparation of materials for and in the manufacture of candles and night-lights.
683. Jean Jacques Ziegler, of Guebwiller, department du Haut Rhin, France—Improvements in machinery for preparing to be spun cotton, wool, silk-waste, flax, tow, and other fibrous substances.
737. John Patterson, of Wood-street—Improvements in apparatus for shaping collars and other similar linen and cotton articles.
766. William Marsden, of Blackburn, Lancaster—Improvements in, and applicable to, looms for weaving.
782. John Venables Vernon and John Edge, of Manchester—Improvements in apparatus and machinery for engraving rollers of glass, copper, brass, and other metallic compounds.
800. Richard Taylor, of Clayton-bridge, Newton-heath, near Manchester—Improvements in heating dye-cisterns and soap-cisterns, used in the process of calico-printing.
834. Charles Watt, of Brompton—Improvements in obtaining currents of electricity.
900. Samuel Cunliffe Lister, of Manningham, Yorkshire, and James Warburton, of Addingham, Yorkshire—Improvements in the manufacture of yarn from fibrous materials.
952. Duncan M'Nee, of Kirkintulloch, Dumbarton—Machine for printing with colours on cloth, and which is also applicable for printing ornamental designs on paper.

*Sealed 25th Jan.*

20. Charles Frederick Bielfeld, of the Strand—Improvements in constructing portable houses and buildings.
363. John Carter, of Meltham Almondbury, Yorkshire—Improvements in the manufacture of woven fabrics.
549. Bryan Donkin, the Younger, of Bermondsey, and Bernard William Farey, of Commercial-road, Old Kent-road—Improvements in the machinery for measuring and marking off long lengths or continuous webs of paper or other materials into any required lengths for the purpose of being cut or otherwise disposed of.
589. William Dantee, of Liverpool—Improvements in preventing incrustation in steam-boilers.
907. Jean David Schneiter, of 8, Rue de l'Abbaye, Paris—Improvements in maps and charts.
927. Robert Milligan, of Harden Mills, Bingley, Yorkshire—Improvements applicable to combing machinery.
951. Arthur Wall, of East India-road—Improvements in preparing sheet metal for ship-building and other uses.
985. William Mayo, of Berners'-street—Improvements in balls or float-valves and cocks.

*Sealed 26th Jan.*

691. William Gossage, of Widnes, Lancaster—Improvements in obtaining sulphur from certain metallic sulphurets.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Jan. 12 | 3410 | A Stereoscope, or Binocular Case. | Wm. Edwd. Kilburn | 234, Regent-street. |
| „ 13 | 3411 | The Manifold Vest. | Nield and Collauder | 5, Little Friday street, City. |
| „ 14 | 3412 | Summer Collar-tie. | John Paterson | Wood-street, City. |
| „ 17 | 3413 | Improved Bearing and Hooks for Scale-beams. | Thomas and John Driver | 89, Minories. |

# SOCIETY OF ARTS.

## FRIDAY, FEBRUARY 4th, 1853.

## NINTH ORDINARY MEETING,

### *Wednesday, February 2nd,* 1853.

The Ninth Ordinary Meeting of the Society was held on Wednesday, the 2nd, Major-General Sir Charles Pasley, K.C.B., Vice-President, in the Chair.

The following were elected Members:

Bayne, A. D., Norwich.
Beardish, Isaac, Holmfirth.
Drew, John, 13, New Burlington-street.
Fothergill, Mark, 204, Upper Thames-street.
Fuller, George Leedham, St. Mary's-road, Peckham.
Harker, John William, 24, Upper Barnsbury-street, Islington.
Phillips, Sir T., Bart., Middlehill, Broadway, Worcestershire.
Phillips, Robert, Cockspur-street.
Quin, Charles William, 25, Clarence-street, Islington.
Towers, George Augustus, Hertford.
Turrell, Henry Stein, Brighton.
Webster, Frederick, 38, Weymouth-street, Portland-place.
Westall, William Mawley, Love-lane, Aldermanbury;

and the names of six candidates for membership were read.

A paper was read on Chromatic Photo-printing, being a mode of printing textile fabrics by the chemical action of light, by Mr. R. Smith, of Blackford, Perthshire.

The author proposes to employ the chemical agency of light in dyeing or staining textile fabrics; the cloth, whether of wool, silk, flax, or cotton, being first steeped in a suitable solution, then dried in the dark, and subsequently exposed to the action of light, those parts which are to form the pattern being protected by pieces of darkened paper, or some other suitable material, attached to a plate of glass. When the desired effect is produced, the time for which varies from two to twenty minutes, according to the nature of the process, the fabric has to be removed, in order to undergo a fixing operation, whilst a fresh portion of it is exposed to light. This may easily be effected by the use of very simple mechanical arrangements, so that a number of photographic printing engines may be placed side by side, and superintended by one person. From the trials which Mr. Smith has made he believes that even the diffused light of a cloudy day will have power enough for the operation, though of course a longer time will be required for its perfection than in a bright and sunny day.

In order to obtain a pale blue or white pattern upon a blue ground, Mr. Smith uses solutions of citrate or tartrate of iron, and ferrocyanide of potassium; steeping the cloth subsequently in a dilute solution of sulphuric acid. Browns and buffs are obtained by using a solution of bichromate of potash, the excess of salt in the parts not acted on by light, being afterwards either washed out, leaving those portions white, or decomposed by a salt of lead which forms a yellow chromate of lead. By combining these two processes with the use of madder, log-wood, and other dye stuffs, a great variety of tints may be obtained.

The secretary stated that though the principles of these processes were all well known, yet that their application to the art of dyeing as proposed by Mr. Smith, was ingenious and apparently new. Whether the plan could hereafter be practically employed would remain to be seen; all that could at present be said of it was, that it certainly merited the attention of dyers and calico-printers, and that though now little more than a suggestion, it might possibly hereafter lead to a new department of dyeing.

A paper was then read by Mr. Wilkinson on Fire-arms. He commenced as follows:

It may be considered that any discussion on Fire-arms and Projectiles is unsuited to the peaceful character of the Society of Arts, but I think it will be found that a knowledge of the use of those implements now before you is better calculated to maintain peace than any harangues on the impolicy of war to the English, whose habits and pursuits have always been averse to it. Those who wish us to be totally defenceless place themselves in the dilemma of being either pitied as madmen, or despised as traitors to their country. It has ever been the opinion of the most eminent men in all countries, in which are included divines, statesmen, and generals, that "*to be always prepared for war is the surest way to avoid it.*" This sentiment has been expressed in a variety of ways, but never more concisely than in the words just quoted of Archbishop Fénélon.

Now it is certain that we never can be prepared for war if we neglect to keep pace with the numerous improvements made by foreign nations around us; and it is equally certain that we have no desire to avail ourselves of them except in our own defence.

My object, however, this evening is not to enter into any controversy either on peace or war, but simply to explain such improvements as have recently been proposed, and wholly or partially adopted.

In order to form some conception of these improvements, I must very briefly allude to the earliest Fire-arms which are still in use in India and various parts of the world. Commencing with the different modes of ignition, Mr. Wilkinson then proceeded to give a rapid sketch of the progressive steps by which Fire-arms have arrived at their present state of comparative perfection; he described and exhibited, first, the Matchlock, invented about the beginning of the sixteenth century; previous to which hand-guns were fired by a lighted match applied to the touch-hole in the same manner as to cannon.

Second, the Pyrites Wheel-lock, introduced into this country about the time of Henry VIII., and continued to Charles II.; in which ignition was obtained by the rapid revolution of a steel wheel against a pair of iron pyrites.

Third, the Flint Lock, introduced about 1692, and generally used up to the close of the last war.

Fourth, the Percussion Lock, invented by the Rev. Mr. Forsyth, and patented by him, April 11th, 1807, was generally introduced into our army, 1840.

He then proceeded to explain the nature of the Rifle, and the theory of Projectiles, which was thoroughly illustrated by diagrams.

Mr. Wilkinson stated that it has been calculated by French writers, that with the old flint musket and spherical bullet during the last war, the maximum effect was only one in 3,000, either to kill or wound; and one in 10,000 was the minimum. So that in some engagements 10,000 ball cartridges were expended to kill or wound one man; and a writer in the *Times* stated, a short time since, that 60,000 cartridges had been fired at the Cape, and only twenty-five Kaffirs killed; so that, after all, war is not more dangerous than many other professions. He observed, however, that this would not be the case in any future warfare; it will be much more destructive for the time, but of shorter duration.

The percussion musket effected very little improvement in the accuracy or range of the bullet, but it produced much greater certainty of fire. It is wholly to the introduction of rifles and elongated projectiles that the recent improvements are due. We were told by Robins a century ago, that this would be the case, but it generally requires a hundred years to convince any Government; and we might still have gone on until defeated, had we not been fortunate enough to obtain, at the precise moment when most required, a Master-General of the Ordnance like Lord Hardinge, determined to investigate, and to give every invention a fair trial.

Mr. Wilkinson then gave a brief history of the changes in the form of the bullet introduced more than twenty years ago, by M. Delvigne, though suggested nearly a century since by Robins, who pointed out that the spherical form was not that best suited for projectiles. Lately the cylindrical-shaped bullet has attracted great attention from the ingenious modification of it, invented by Capt. Minie, who added a small iron capsule to the lower end of the bullet. Lastly, Mr. Wilkinson described his own improved bullet, the form of which is *cylindro-ogivale*, having two deep grooves round the base; and the novelty of which consists in the bullet being expanded in the act of discharging the rifle, although the bullet is perfectly solid.

At the close of his paper, the author explained the electro-magnetic chronoscope, a beautiful and very ingenious mode of measuring the flight of projectiles, invented by Professor Wheatstone. The principle on which this was effected, consisted in the interruption of an electric current, by the breaking of a fine wire, when the gun was fired, the circuit being again completed by another arrangement when the target was struck; whilst a clock, with suitable stop-hands, was employed, to indicate the interval of time between the discharge and the blow on the target.

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A paper was then read, on Winiwarter and Gersheim's patent "gun-primers," and composition for fire-arms, by Mr. Winiwarter, of Vienna.

The various applications included in Gersheim's patent all more or less depend on the nature and properties of their new composition powders; which, at the same time that they may be employed to replace gunpowder as a propelling power, may also be used instead of fulminating powder, as a means of inflaming or firing. These patent explosive compositions consist of mixtures of various well-known explosive substances; namely, chlorate of potash, fulminating mercury, fulminating zinc, amorphous phosphorus, and binoxide of lead. But to each of these different mixtures a solution of gun-cotton or collodion is added as a cement, and the application of this substance is the chief peculiarity of the invention.

The patent percussion primers are manufactured in various shapes, to suit the different purposes to which they are applied; the composition is moulded into any required form, dried, and then covered with a film of varnish and bronze powder. Thus, in fact, the whole of the pellet, whatever may be its shape, is entirely formed of the detonating material, and the use of the ordinary copper cap is wholly dispensed with; whilst, in consequence of the peculiar nature of collodion, and its insolubility in water, the very material employed to bind together the different components of the powder acts as a waterproof varnish,—at the same time binding them together, and protecting them from the action of moisture.

Although these percussion primers ignite readily, either by a blow or by friction, yet they are much less easily exploded than the ordinary percussion caps,—a fact which is readily proved, as they may be crushed in a vice, or between the teeth, without any chance of their exploding. A second important peculiarity is their being not liable to injury from damp; the collodion so perfectly protects the other explosive components of the powder from the action of water, that they may be made to detonate even under water. Thirdly, the patent primers, though they burn quite fast enough, give out a more lasting flame than ordinary copper caps; they readily ignite gunpowder, even through cartridge paper, and by the more perfect and complete explosion of the powder which they cause, enable a saving in the charge of gunpowder to be made.

The primers are now manufactured of four shapes, namely as round shot, as small disks, and in the form of nails either small for muskets, or larger for cannon. Those formed in the shape of shot, or of small nails, are suited for use in ordinary percussion guns; all that is necessary for their use is somewhat to increase the size of the nipple. It is necessary to observe that, though the upper part of the nipple must be made so large that the primer can be put into it, the channel for the flame must be very small, or the hammer might possibly be thrown back by the power of the discharge. In the ordinary copper cap this is a matter of much less importance, because the cap itself for the time closes the aperture of the nipple; but with the patent primers this is not the case, and if the primer does not fit the nipple very accurately, or the channel of the nipple is not very tight, the gun is liable to miss fire.

The disks, or pellet-shaped primers, are chiefly intended for use in "needle rifles," either as priming or even a charge; they may be used either with weapons loaded at the muzzle, or at the breach. It has been objected that the shot-shaped primers are inconvenient from their small size and the consequent difficulty of dropping a single one, each time the gun has to be fired; in order to meet this difficulty, a little reservoir has been contrived, which moves backwards and forwards by the action of the

**trigger, depositing every time when the lock is cocked a singler primer in the nipple.**

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COL. PORTLOCK bore testimony to the clear and satisfactory manner in which Mr. Wilkinson had laid before the meeting the historical facts, and the principles connected with projectiles. There was no doubt that Mr. W. was correct in his remarks upon the tardiness of the English in adopting a new system; and in the fact that we were returning to the study of principles which were promulgated 100 years ago. It required, however, a considerable amount of study and experience to establish the soundness of those principles. A cautious people like the English naturally hesitated to adopt novelties upon the mere authority even of the most eminent men; and the spread of general knowledge and habitual research which characterized the present day, had but recently sprung up. Improvements in civil engineering or architecture were readily brought before the members of those professions, and their value at once proved and adopted on their merits, without reference to bygone authority. In military matters we had not yet reached that point; any decision once arrived at could not be overthrown without the sanction of the Commander-in-Chief and the Master-General of the Ordnance, based upon the Reports of Committees, which were not always unanimous. If, however, undue caution had been shown in the admission of the principle of elongated balls, the very fact that, so soon after its adoption, the further improvements of Mr. Wilkinson had been admitted, was a proof that a more satisfactory system was growing up, and that military mechanics and engineering matters would be henceforth tested more by their real importance than by the force of any past authority. (Hear.) With respect to the form of projectile, it was plain that every axis of a spherical ball was equal; and therefore if rotation should be formed upon any one axis, there was no tendency to restore the rotation upon any other axis. In the elongated ball, however, the true or geometrical axis might be assumed to be nearly coincident or parallel with the axis of the barrel; so that if rotation were established upon any other axis, even after the ball had left the rifle, there would be a tendency to restore rotation round the true axis, or in the direction which the ball ought to take. Captain Minie's invention was one of very great beauty; but Mr. Wilkinson's method of causing the ball to expand, so as to fill the grooves of the rifle, was free from some of its evils, and possessed all the simplicity of the common musket ball. So far there had manifestly been a movement in the right direction; and it might lead to greater results than even Mr. Wilkinson expected. It appeared even to point to an improvement in cannon balls. These, from the purposes for which they were intended, could not be formed of lead; but Mr. Wilkinson's improvements might lead to an application of the Minie principle, though in a reverse order to that in which iron was introduced into the musket ball. It had been too much the habit to over-rate the bravery, and to under-rate the scientific knowledge, of the British soldier; but it was beginning to be felt that knowledge was no impediment to bravery. It had been said that too much study would interfere with the *dash* of the soldier; but under the term *dash* there lurked a fallacy, and successful dash too often obtained the credit due to less success united with more talent. The time formerly occupied in loading the rifle was an impediment to its adoption; but by the improvements now introduced, a body of soldiers, in moving, as they must, over a certain extent of ground, would be enabled to charge an advancing body in a state already broken and disheartened, when they arrived at that point where the bayonet could be effectually employed; and neither the courage of the soldier nor his power of using the bayonet would be diminished by the advantage previously gained by a rifle capable of being loaded with the same facility as the common musket. In conclusion, Colonel Portlock urged the importance of the rifle as a defensive weapon, especially in the hands of civilians, who, in the case of invasion, must, without the advantages it afforded, be far inferior antagonists to organized soldiers.

The CHAIRMAN referred to his own observation of the practice with the Minie rifle, in which, at 200 yards, every shot was put into the target; a remarkable contrast with the old musket, the fire of which at that distance was very uncertain. The improved facility of loading introduced by Mr. Wilkinson, and other ingenious gun-makers, was a great advantage. He did not, however, think these improvements would change the fate of war; skirmishers on each side would be thrown out, and one or the other must give way—when the troops of the line would come forward, and, however the term *dash* might be reprobated, battles would never be decided at a great distance; it must come to the bayonet at last.

MR. VARLEY, jun., inquired if Mr. Wilkinson's bullets were intended to be fired with any covering. He had found the Minie bullet more effectual with a covering than without. He also asked whether the new bullets ever turned round, so as to enter the mark sideways, from the tendency of all bodies, in spite of the force of gravity, to revolve upon their shorter axis.

MR. WILKINSON said he preferred to use nothing but the naked powder and ball; the latter being rubbed with Russia tallow, or other grease, to fill the grooves. The pressure upon the grooves squeezed out the grease, which lubricated the whole extent of the bore, and diminished friction; so that 100 rounds could be fired as easily as one. The bullets were never found to turn; their tendency to do so from revolving on the shorter axis being overcome by the air entering the grooves; just as a spinning-top, when moving unsteadily, was righted by the action of the air. To explain this, however, in detail, would require almost another lecture.

CAPTAIN OWEN inquired the exact difference between the Swiss ball and that of Mr. Wilkinson.

MR. WILKINSON explained a difference in size, &c., which greatly facilitated the loading on his plan. In reply to an objection to the use of grease in hot countries, Mr. W, stated that, with the thermometer at 130°, 100 rounds had been fired in thirty-six minutes; the barrel and other iron work being so hot that it could not be handled. The grease in that case was still used, but with the addition of about one-eighth of beeswax, which entirely overcame the difficulty.

CAPTAIN OWEN referred to his own experience in the war at the Cape, in 1848, as some justification of the reluctance to adopt novelties. The 7th Dragoons were then supplied with the ordinary two-grooved rifles instead of their carbines: but it was found necessary to provide them with smooth bore ammunition—that originally supplied fitting too tight. The newspapers had ignorantly condemned the Government for sending out a regiment of dragoons with carbines, whereas the local corps were the Cape Mounted *Rifles*, arguing that the latter weapon was the most effective. In fact, however, the Cape Rifle Corps were armed with two-grooved carbines, and these were generally allowed to be the

**best weapons for Caffre warfare; in which rapid loading and firing was the chief requisite.**

**Thanks were voted to Mr. R. Smith, Mr. Wilkinson, and Mr. Winiwarter.**

It was announced that on Tuesday evening next an extraordinary meeting of the Society would be held, at eight o'clock, when a paper would be read by Mr. Yapp, on the proposed reforms suggested by the Colonial and International Postage; after which a discussion would be invited.

## LECTURES ON THE MANUFACTURE OF COTTON.

**The Council have arranged with Mr. Frederick Warren, of Manchester, to deliver a course of Four Lectures on the Cotton Trade and Manufacture. These Lectures will be given on the 14th, 17th, 21st, and 24th of this month, at eight o'clock in the evening. Members of the Society desirous of attending are requested to apply for their tickets at the Society's House, on or before Wednesday, the 9th. Members may obtain tickets for their friends at Sixpence each. After the 9th inst., any remaining tickets will be issued to the public at One Shilling.**

## LEGAL POSITION OF INSTITUTES.

**First Report to the Council of the Society of Arts from the Institutes' Committee, on the Legal Position of Literary and Scientific Institutes.**

**The Institutes' Committee has long had under consideration the very important subject of the Legal Position of Institutes, with a view to obtain such legislative facilities as may be requisite for its improvement.**

The obscurities and imperfections of the Act 6 and 7 Vict. cap. 36, which had for its object to exempt Scientific and Literary Societies from local rates, have been fully exhibited in the courts of law, and have received much attention from learned persons and others, interested in such societies, as well as from the Provincial Unions of Institutes, and particularly from the Yorkshire Union.

On the one hand, it has been forcibly argued that the legislature's obvious intention to exempt the Institutes from local rates has been defeated by the faulty phraseology of the Statute, and that therefore the Statute should be amended: and, on the other hand, it has been suggested that the principle of exemptions is in itself unsound; that it is inconsistent with the dignity, and therefore not really conducive to the interests, of the Institutes, that their property should be exempted from charges to which other property is liable; and, therefore, that the Act of 6 and 7 Vict. cap. 36 should be, not amended but simply repealed.

Your Committee appreciates the importance of these questions, and has introduced them into this Report with a view to elicit the views of the Institutes on the subject, and a consideration and discussion of them in the Journal.

At present, your Committee desires to direct attention to a subject of paramount importance —the legal insecurity of the Institutes and of their property.

All persons who have been concerned in the establishment of an Institute are aware how very difficult it is to obtain a suitable site for the building, to convey it in trust for the appointed uses, and to secure the personal property in a mode not open to serious objection.

Legislative facilities have long been abundantly afforded for the conveyance and endowment of sites for churches. Since 1837 numerous statutes have been passed to afford such facilities in the case of normal and elementary schools; but no such facilities have been granted to Institutes. They are, however, schools of an important kind — a necessary complement to other schools; and it is not easy to see why the whole of the facilities which Parliament has given, under the School Sites Act, to schools, should not be rendered applicable to Institutes. It is to be hoped that such a legislative recognition of their value would not now be withheld; and accordingly it is proposed to prepare a bill (the heads of which your Committee will print), which will contain (*inter alia*) a clause declaring that the Acts cited in the margin, being the School Sites Acts now in force, shall be applicable, in all respects, as fully and completely, to Institutions as if they were the schools originally contemplated in those Acts.

4 & 5 V. c. 38.
7 & 8 V. c. 37.
12 & 13 V. c. 49.
13 & 14 V. c. 28.
14 & 15 V. c. 24.

If such a clause should become law, nearly all the restrictions and expensive processes which in this country impede the transfer of real property, and which in numerous cases absolutely prevent the due conveyance of the sites of Institutes, would become inoperative against the parties to a conveyance of land or buildings for an Institute. Such property might then be granted, conveyed, or enfranchised, for such an object, by a simple and inexpensive form, by any person beneficially interested and being seised in fee simple, fee tail, or for life; by any lord or lady of a manor, in respect of common land; by the officers of the Duchies of Cornwall and Lancaster; by clergymen, in respect of glebe; by any person equitably entitled to but not holding the legal estate in land; by any infant or lunatic, through his guardian or committee; by any justices of the peace; corporations; trustees or commissioners for public, ecclesiastical, parochial, charitable, or other purposes. Moreover, the legal estate in the Institutes might be vested in any corporate body or bodies sole or aggregate, lay or ecclesiastical, without licence to hold lands in mortmain, without renewal of deeds, and without risk of an expiry of trusts. An efficacious and cheap remedy would be provided against any unlawful "holding over" of the premises on the part of any residen officer. The death of a grantor within twelve months would not invalidate a grant. The conveyance of copyhold by the lord and by the tenant, in one deed, would vest the freehold in the grantee without surrender or admittance in the lord's Court. Conveyances might be made to trustees and to their successors in office.

The Institutes also suffer severely from som of the graver evils of the law of partnership The property of an Institute is the property of all its members; in the eye of the law they ar partners; and, if any one (or more) of them be dishonest, and attempt to despoil them of their property, their remedy is a suit in Chancery—the member is a partner; and partnership causes are of equitable not legal cognizance. And, moreover, the whole of the remaining members must be separately joined in the suit; for the Institute, not being incorporated, cannot sue or be sued in its collective capacity, under its proper title, or in the name of its principal officer. These defects might easily be remedied by well-conceived enactments; and secretaries, collectors, or other functionaries, misappropriating the funds or other property of an Institute, might be declared guilty of a misdemeanour, in accordance with the precedent of the Savings Bank Act, 7 and 8, Vic. c. 83.

The last point to which, in the present Report, your Committee desires to direct attention is the anomalous and improper position in which all Institutes are placed in reference to the Acts of 39 Geo. III., cap. 79; and 57 Geo. III., cap. 19.

Those statutes provide, that every house; room, or place in which any lecture or discourse shall be publicly delivered, or any public debate shall be had, on any subject whatever, to which any person shall be admitted by payment of money, or by any ticket delivered in consideration of money, or in consequence of having paid, or agreeing to pay, any money, shall be deemed a disorderly house or place, unless the same shall have been previously licensed by the Justices of the Peace in Quarter Sessions. That every such licence shall continue in force for not more than a single year; and may be revoked at any time within the year; that any Justice of the Peace may at any time demand admittance to any such lecture, discourse, or debate, whether in a licensed or unlicensed place; that the person by whom the house, room, or place is opened and used for lectures, &c., without licence, shall, on conviction, forfeit the sum of 100*l.* for every day of such opening, and be otherwise punished as the law directs in the case of disorderly houses; that every person who shall manage or conduct the proceedings, who shall act as president or chairman, who shall debate, discourse or lecture, who shall pay or receive money, or deliver or receive tickets for admission, or who shall refuse admittance to the Justices, shall for every such offence forfeit the sum of 20*l.*; such penalties to be paid on conviction to any one who will sue for them; but the Attorney General to have power of staying the proceedings at any time.

Few persons probably are aware that any provisions such as these are at this day in force. They may have been necessary when those statutes were passed, but are now unnecessary, and improper, and ought to be immediately repealed, in so far at least as they may affect the Institutes. In 1846, a bill to amend those statutes was brought into the House of Commons by Mr. Duncombe, Sir De Lacy Evans and Mr. Aglionby. It was considerably altered in Committee, but finally became law—viz., the Act 9 and 10 Vic., cap. 33. It recites that the provisions of the Acts 39, Geo. III., cap. 79 and 57, Geo. III., cap. 19, have given occasion to vexatious proceedings by common informers; and merely enacts that in future no proceedings under those acts shall be commenced, unless in the name of the law officers of the Crown. This amendment appears to your Committee to be insufficient to meet the requirements of the case. In the present state of public opinion, no law officer of the Crown could proceed against an Institute under the provisions of those statutes; but the Institutes ought to be wholly exempted from such provisions; and your Committee is of opinion that the exemption should now be secured by the bill which is proposed to be framed.

HARRY CHESTER,
Chairman of the Committee.

*January 26th*, 1853.

## INSTITUTE LECTURES.

MR. G. W. YAPP will communicate with those Institutions in union which require Lectures on Practical Art Education. Mr. Yapp's Lectures will be illustrated by examples, recommended by the Department of Practical Art. Institutions requiring Lectures on this subject will have the goodness to communicate with him.

## COLONIAL CORRESPONDENCE.

### JAMAICA.

THE following paragraphs are extracted from a letter just received from Captain Grey, R.A., the Honorary Secretary of the Society of Arts at Jamaica.

"The Jamaica Society looks forward with great pleasure to the communications of which some expectation is held out in your letter, and, in the outset, would esteem highly any useful information as to the prices which might be expected in the English market for any of the tropical products which have not hitherto formed part of the principal exports of this or of the neighbouring colonies; as, for instance, any portions of the cocoa-tree, or of the fibres or tissue of the plantain, aloa, penguin, &c., or for vegetable oils, gum, and resins; for medicinal senna of a fine quality, for vanilla, for quassia amara, and for ornamental woods.

"The latest inventions and machinery for raising water from depths within the sphere of action by pressure of the atmosphere; and the most scientific and economical methods of making and preserving tanks and reservoirs of water for irrigation and for filtering and of forming flat or terraced roofs and water-pipes, are objects of great interest also. The state and progress of the law of patents in England; the easiest methods and most recent practice of chemical analysis of soils and minerals, and of smelting, refining and assaying metals.

### "PROCEEDINGS OF THE JAMAICA SOCIETY OF ARTS.

*October 23rd*, 1852.

"The Governor thanked the gentlemen present for their attendance, in compliance with the request which he had made for the purpose of determining in what way the views of the Society of Arts in London, of which his Royal Highness Prince Albert was the President, could be most effectually promoted in Jamaica.

The Governor then read the circular of the 24th April, 1852, which he had received from the Secretary of State, and the enclosed communication from the Society of Arts, of which he mentioned that copies had been published in Jamaica, in the *Morning Journal* of the 5th of the present month of October.

"The Governor also read the dispatch, No. 64, July 24, which he had written, in answer to the Secretary of State's communication, and stated the steps which had been taken with a view to form a subordinate Society of Arts in this colony, and moved the following resolutions:

"1. That the gentlemen now present do form themselves into an association under the name of the Jamaica Society of Arts, to which all present expressed their assent by their written signatures.

"2. That that the meetings of the Society be held on the last Saturday of every month, at half-past twelve o'clock, in King's House; which was also unanimously assented to.

"3. That each gentleman who wishes to remain a Member of the Society shall contribute one shilling a month, which may be paid to the Honorary Secretary in advance for the remainder of every current year, ending on the 31st December, or in monthly payments; which resolution was also passed unanimously.

"Captain Grey, R.A., and A.D.C. to the Governor, assented to act as Honorary Secretary.

"The Governor then read the heads of a letter which he proposed should be addressed, through the Secretary of State, to the Society of Arts in London, by the packet of the 11th November, and undertook to lay the letter before the next meeting in a more perfect form for their approval, and gave notice that he should then propose, that the Society should divide itself into a certain number of Standing Committees, each taking a separate department or branch of inquiry and investigation under its special care; and he requested that gentlemen would consider, in the interval, in what departments they could respectively render the most efficient service, and what other gentlemen resident in the island, they should most desire to have associated with them in their investigations.

"Thanks were voted to the Governor upon the motion of the Vice-chancellor, and the meeting then adjourned to Saturday, the 30th October, at half-past twelve o'clock p.m."

*October 30th.*

"The Governor read to the Meeting two circulars from the Secretary of State, respecting the specimen of dried plantains, sent by Colonel Reid to the Exhibition, and as to the method of preparing them in Mexico; also a despatch from the Secretary of State, dated 26th June, 1852, containing the Duke of Richmond's suggestions as to guano.

"The meeting then determined upon the appointment of seven Committees, to whom respectively the subjects hereinafter named should be assigned for investigation, viz.:

"1. The state of the cultivation and manipulation of the principal exports of the island, viz., Sugar and Rum, Coffee, Pimento, Arrowroot, Ginger, &c., and generally the present state of the Agriculture of the Colony, and the practicable improvements that may be suggested.

"2. The Timber and Ornamental Woods.

"3. The capabilities of the Island for irrigation and hydraulic engineering; the state of Water-reservoirs, and art of making Tanks, Water-pipes, Terraced-roofs, and as to the best sorts of Pumps.

"4. The Minerals.

"5. The Medicinal Waters, Plants, Gums, Oils, and other medicinal substances.

"6. The Manufactures, Handicrafts, and Trades of the Island, besides those immediately connected with Agriculture, and the new ones that might be usefully introduced.

"7. The Vegetable products of the Island which, it is supposed, might be exported as raw material, but which are not yet used in that way.

"And the names of the gentlemen who, it was considered, might appropriately be appointed to each Committee, were read, and

"A resolution was proposed and agreed to, that each Committee be requested to collect specimens of objects of interest for transmission to England.

"The Meeting then adjourned."

## HOME CORRESPONDENCE.

### EXCHANGE OF ILLUSTRATIONS.

Leek, Jan. 29th, 1853.

SIR,—At the Mechanics' Institution, in this town, we have lanterns and apparatus for dissolving views with five inch lenses, and also a small assortment of views, which, having been several times used here, are of little further service to us; and we find that to *purchase* fresh views for each separate lecture would be more expensive than we can afford. I should be glad, therefore, to ascertain through the medium of your Journal, whether arrangements could not be made by us with other Institutions or individuals, for the exchange or loan of views for a short period from time to time; and I should be happy to communicate with any party as to the terms.

W. CHALLINOR.

### PHOTOGRAPHIC CAMERAS.

Parkstone, Jan. 29th, 1853.

SIR,—The want of artistic effect so much complained of in photographic pictures cannot be attributed to the camera, because the views in a camera, as seen by direct vision, are a true and faithful representation of Nature itself; always excepting chromatic and spherical aberration, with which we must contend as best we may. But in sun pictures there is a third source of error in actinic aberration, or the difference of refrangibility between the actinic or chemical, and the pure light rays.

I would propose to substitute for the clear white achromatic object-glass, one of a suitable deep blue tinge, which would oppose an effectual barrier to all the red and yellow rays. Sun pictures would then be much more uniform in appearance and tint, and would possess that artistic effect, the absence of which is so very detrimental.

The great reduction in light would be of no importance, because photographs are formed by the actinic rays alone, which penetrate through even very dark blue media.

HENRY W. REVELEY.

### TONNAGE OF SHIPS.

Millwall, Jan. 31st, 1853.

Sir,—I was rather surprised to see it stated by Mr. Reveley that by the old law, the depth of a vessel was taken into account in calculating the tonnage. I am quite aware that the distance between the wing transom and the rabbit of keel was taken to allow for the rake of stem port, but I have yet to learn that the depth from transom to keel is the depth of the vessel; in fact, if you were to build two ships of the same length and breadth, but one of them half as deep again as the other, the deeper ship would be about one per cent. less tonnage than the other. Hence we have those boxes with the ends rounded off, termed wall-sided ships.

With regard to my second error, it appears only one of omission. If I had said after the word "boys," "and pay tonnage and light dues for every 100 tons' register," I do not think Mr. R. would have had much to rectify. But I certainly should pause before I charged so respectable a body as the ship-owners of this country with deliberate fraud.

I cannot agree with Mr. Reveley, that the new law of tonnage is utterly at variance with improvement; for although it is not perfect, yet by taking the breadth and depth at different parts of the hold, it is an approximation to the truth, and every careful observer of the progress of ship-building must have noticed the very great improvement within the last few years. Under this law the *Stornaway*, *Challenger*, and other ships have been built, that have not only made their passages in less time, but have turned out from thirty to fifty per cent. more cargo than their American competitors; and I think the Society of Arts would be conferring a very great benefit on this country if they could bring their powerful influence to bear in assisting to obtain the removal of those laws which either compel the ship-owner, in self-defence, or allow him, from motives of avarice, to fetter the hands of our ship-builders.

J. P. Roberts.

## COMMUNICATION BETWEEN GUARD AND DRIVER.

Sir,—At page 119 of the "Journal of the Society of Arts," you give an account of a means of communicating between guard and driver, as adopted by the Brighton Railway Company. If you will refer to page 500 of the "Railways of Great Britain and Ireland," a copy of which is to be found in the library of the Society of Arts, you will discover that this is the plan I recommended thirteen years ago, and which is in extensive use on the Continent, especially on the Prussian railways. It is so much the custom now-a-days for persons to adopt the designs and inventions of others without making any acknowledgment, that I shall feel obliged if you will insert this communication, which may be the means, perhaps, by its further introduction, of saving many valuable lives. I am, Sir,

Yours, &c.,
Francis Whishaw.

## ART OF ENAMELLING.

Sir,—In the extract from the article Enamelling, which you did me the honour to quote in your last *Journal* from my Cyclopædia, there is a small omission in one of the tables, which, however, is of such importance, that if my fellow-members attempt to compound enamels according to the proportions given in your quotations, they may meet with loss and disappointment.

In my article directions are given for compounding an alloy of lead and tin in five proportions, forming respectively the alloys No. 1, No. 2, No. 3, No 4, and No. 5. In the receipts for opaque enamels (also five in number), one or other of these alloys is used, and by omitting in your quotation the No. 1, No. 2, &c., it appears to be a matter of indifference which of the five alloys is to be used. It is, however, of great importance that each one of the five be used in its right place. The table of receipts for opaque enamels should stand thus:—

| | No. 1. | No. 2. | No. 3. | No. 4. | No. 5. |
|---|---|---|---|---|---|
| Silica........ | 3 parts | 3 parts | 3 parts | 10 parts | 3 parts |
| Alloy | (No.1) 4 | (No.2) 5 | (No.3) 6 | (No.4) 18 | (No.5) 7 |
| Nitre ........ | 2·5 | 2 | 1 | 4 | 0 |
| Borax........ | 0 | 1 | 1 | 1 | 1 |

Charles Tomlinson.

## LECTURES.

Jan. 21st, 1853.

Sir,—I regret to say that our Directors have not been able to avail themselves of the "Schedule of Lectures for the Spring Session of 1853." Understanding that a List of Lectures for the spring would be issued by the Society of Arts, we departed from our usual arrangement of having only one course, and intended engaging one or two English lecturers for our second course. This, as I have said, we found ourselves unable to do: First, because we were acting alone; the other Institutions in our neighbourhood having already made all their engagements; and it was, therefore, out of the question to expect lecturers residing at a distance to visit us singly, at the rates we could afford to give them. And secondly, because the "Schedule" issued was much less definite in its announcements, and the subjects fewer than from the preliminary circular issued by the Society, we had expected would be the case. We have, therefore, engaged lecturers for this spring in our own locality. As this matter seems, to our Directors and to myself, to be not only of great but of vital importance to the provincial among the united Institutions, you will perhaps pardon me for adding a few words to those which have already appeared in the Society's Journal on the same subject; and, in order that you may know that we do not speak without some experience, I may mention that our Institution, in a town containing a population of about 10,000, has existed (with only two or three years' interruption) since 1827. During a large portion of that period we have supplied to the inhabitants a succession of first-class lecturers; and when an interruption did take place, this arose, not from a disinclination on the part of the inhabitants to give in their support, but from the impossibility of our obtaining lecturers of sufficient talent, and subjects sufficiently varied. The cause of this failure becomes evident enough when I state to you that when I first became connected with our Association, about eighteen years since, the usual rate of remuneration to lecturers was about 2*l*. per lecture, including expenses. The enthusiasm connected with the movement then being made for supplying solid information to the working-classes was, however, so great, that for a number of years excellent lecturers were obtained, principally from the neighbouring cities of Edinburgh and Glasgow. After a time these could not be had. We were therefore obliged to resort to lecturers of an inferior kind, who quickly brought us to a dead lock—the falling off in the attendances involving us, even at the low rates paid, in considerable difficulties.

Our Directors, in reviving the Institution, determined to try what could be done by giving higher rates of remuneration, at least, for a portion of each course. A gentleman of known eminence was therefore engaged to deliver six lectures (he having previously arranged to be in our neighbourhood), for which he received 25*l*., including expenses. This course paid, and left a small surplus. Since that period our Institution has had a regular attendance of from 250 to 300, and every course has just about covered the expenses; but a large proportion of our lecturers has been of the first-class, and the amount of valuable information communicated has been very great. The usual rates we have paid have been 3*l.* 3*s.* and 4*l.* 4*s.* per lecture, including expenses; and we have found that gentlemen of the first eminence can be induced to lecture to us at the latter rate,—provided we can take them at times suiting their convenience, and when we can arrange, by uniting with other Institutions, to fill up their time while they are with us. The opinion of our Directors, from all the experience they have had, now is, that, in such Institutions as ours, in order to ensure success, a portion at least of each course must be delivered by gentlemen of first-rate eminence; and I may add, they find it best, in a course, say of ten lectures, to have two or three different lecturers engaged.

Before concluding, will you allow me to say, that it has been usual with Institutions in this locality to arrange, during the summer or autumn, for the whole of the lectures to be delivered in the ensuing winter and spring, and to announce these as one course. Perhaps it might be possible, in future, at once to present such a list of lectures as would allow Institutions either to follow this plan, or to make a division of the winter and the spring courses, as might be found convenient. I would also express a hope that the list of short courses in the next "Schedule" issued by the Society of Arts may be more numerous, and that the subjects may be given more in detail than in that which has been sent to us; and also that the names of the gentlemen who would engage to lecture may be at the same time given, leaving to the different Institutions to correspond, and make their arrangements with the lecturers themselves.

I am, &c. &c.,

G. H.

## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ENTOMOLOGICAL, Jan. 24.—J. O. Westwood, Esq., President, in the chair. The ballot for four new members of the Council, showed that E. Newman, W. W. Saunders, A. F. Sheppard, and S. Waring, Esqs., were elected in the room of F. Smith, H. T. Stainton, J. J. Weir, and W. Yarrell, Esqs.; and the following were also elected to the respective offices for the ensuing year: E. Newman, Esq., President; S. Stevens, Esq., Treasurer; and J. W. Douglas and W. Wing, Secretaries. The President announced that the Council had received three essays in competition for the prize of 5*l.*, offered by the Society for the best essay on the Duration of Life in the Males, Queen and Workers of the Honey-bee, the determination of which was a matter of great practical importance to the bee-keeper; and that they had awarded the prize to a very able paper, which was afterwards found to be by Mr. Desborough, of Stamford.

## PROCEEDINGS OF INSTITUTIONS.

BISHOP STORTFORD.—The members of the Literary Institution gave a soirée on Wednesday evening last, which was attended by about 300 persons, including the principal inhabitants of the neighbourhood. The Assembly-room was crowded with works of art and objects of curiosity. The Rev. T. T. L. Bayliff made a few introductory remarks on the character and usefulness of such meetings, and of the Institution which gave rise to them; after which the Rev. Mr. Jeffries read his Prize Essay on "the Development and Balance of the Mind." A Prize Poem was subsequently read by Mr. Mullinger, jun. The rooms were again thrown open on Thursday.

BROMSGROVE.—At the soirée of the Literary and Scientific Institution, held in the National School-rooms, on Wednesday evening, Lord Lyttleton addressed the assembly, remarking that such institutions gave a stimulus to elementary education, at the same time that they gave the adult population the means of finishing their education in their leisure hours.

CARLISLE.—On the evening of Tuesday last Major Monins delivered a Lecture at the Mechanics' Institution, on the subject of Maritime Discovery. The lecture occupied an hour and a half in delivery, was well digested, and proved of a highly interesting character. On the conclusion of the lecture, Joseph Ferguson, Esq., M.P., in a few complimentary observations, moved a vote of thanks to Major Monins, which was seconded by Mr. Davidson, and unanimously carried.

DOWNPATRICK.—The Twelfth Annual General Meeting of the members of the Mechanics' Institute was held in the Assembly-room, on the evening of Thursday. the 6th January, for the purpose of electing a Committee of Management for the year 1853. There were about seventy members present; C. W. Ruthven, Esq., occupied the chair. After the Report and balance-sheet for the past year were read and adopted by the meeting, and some alterations made in the laws of the Society, the ballot for the new Committee was proceeded with; and the following officers, with twelve Directors, were declared to be its members. President, D. Harrel, Esq., J. P.; Vice-president, Mr. R. T. Lithgow; Treasurer, Mr. J. Tate, jun.; Secretary, Mr. H. Montgomery. It appeared from the documents submitted to the meeting, that the Treasurer had received during the year 70*l.* 13*s.* 5½*d.*, and disbursed 50*l.* 13*s.* 1*d.*,—leaving a balance in hand of 20*l.* 0*s.* 4½*d.*; and that the total liabilities of the Society would be fully covered by the uncollected subscriptions. Considerable additions had been made to the Library; and several Lectures on popular subjects had been delivered before the members. The Reading-room, which is well supplied with papers and periodicals,—upwards of thirty of the former being laid on the tables weekly,—had been regularly attended by the great majority of the members.

DUNMOW.—The Sixth Annual soirée of the Literary and Scientific Institution was held in the Town-hall, on Tuesday evening, the 25th ult.; the Rev. C. Lesingham Smith, the President, in the chair. The party consisted of at least 150 persons, and included a deputation from the Bishop Stortford Institution.

ELY.—A Lecture "On the present condition of the Ely Mechanics' Institution, and the prospects of Mechanics' Institutions in general," was given on Friday evening, the 21st ult., by W. Marshall, Esq., the Honorary Secretary. It appears that the number of members had recently decreased from 100 to 80, and subsequently to 70; but the books had increased from 600 to 1,700.

HALSTED.—The Rev. Henry R. Reynolds, B.A., of Leeds, delivered a most interesting lecture at the Assembly-room, on Tuesday evening last, to the members of the Mechanics' Institution, on "The Poetry of Wordsworth." From the philosophic and highly imaginative character of Wordsworth's poetry, it was supposed by some that the evening's entertainment would be but partially appreciated and enjoyed by a popular audience. The lecturer having opened his subject soon dispelled this feeling by a lucid, elegant, and spirit-stirring strain;

and having secured the attention of his audience, he bore them away into the airy realms of Wordsworth's creative fancy, and unfolded with a graceful and masterly hand the glowing beauties that are scattered so profusely on every side. We err if we suppose that only can be instructive and profitable which is received intuitively into the mind, and that those who pretend to enlighten, instruct, and gratify, should invariably cower down to the level of their audience. This would be to make the less elevated satisfied with the crumbs which fall from Nature's table, when by the aid of others, and vigorous self-cultivation, they might rise to its outspread banquet with their more gifted brethren; the excess or perfection of which heightened enjoyment would differ only in degree, according to each individual capacity to enjoy. The lecturer dilated copiously upon the severe and unjust criticism by which Wordsworth's first productions were assailed by the Edinburgh and other critics and reviewers, and how for twenty long years Wordsworth stood smiling in his spirit, in the conscious majesty of his poetic mission and power, calmly and patiently awaiting the judgment and juster appreciation of posterity. It is not always that an author is the best judge of his own productions, or can heroically bear the scourge of a fierce and false criticism that crushes the first offspring of innate genius, and coolly wait for approaching times to receive at its hands an undying verdict in his favour. Wordsworth did this. And the lecturer contrasted his conduct with that of Byron, who writhed and retaliated under the lashes of Jeffery, and also of Keats and others, who suffered severely from their anxiety for immediate fame. He quoted an extract from one of Wordsworth's letters to a lady of eminence in reference to the criticism upon his poetry at that time, which went to show how magnanimously he bore their unequal efforts and ability to decide his fate as a poet; and proceeded to describe in fervid terms how he lived to see from that very emperium of judgment, the leaven of his own poetry giving a bias and a law to their own decisions. Having advanced in this apologetic strain, the lecturer proceeded with some graphic descriptions of Wordsworth's powers as a poet, quoting from more recent criticism in his favour, and interspersing the whole with selected gems of thought and poetry from his works—from his severe and telling power in blank verse—the thrilling note of the nightingale in his sonnet—down to the august simplicity of his minor but exquisitely beautiful pieces. To the defects of Wordsworth he was kind; it was evident "with all his faults he loved him still;" and attributed his supposed defects to a lofty and excessive imagination, while the consequent distance which separated him from others may frequently have rendered him obscure and unintelligible. A vote of thanks was passed with acclamation to the Rev. H. R. Reynolds; and the meeting separated, highly gratified with his excellent lecture.

Hastings.—At noon on Tuesday, the 25th ult. the local exhibition of the Mechanics' Institution was opened, on which occasion all the leading gentry of the neighbourhood were present. The Earl of Waldegrave opened the proceedings with a few remarks on the advance of science. The collection comprised a vast variety of objects of all kinds. On Wednesday and Thursday evenings the exhibition was visited by the members of the St. Leonard's Mechanics' Institute.

Ipswich.—The Twenty-eighth Annual Meeting of the members of the Mechanics' Institution was held in the Lecture-hall on Thursday evening; the Mayor, S. H. Cowell, Esq., occupied the chair. The financial statement and Report of the Committee were read by Mr. Gowing, the Secretary; from the former of which it appeared that there was a balance due to the Treasurer of 43*l*. 14*s*. 5*d*.,—the receipts having been only 416*l*. 15*s*. 11*d*., against an expenditure of 460*l*. 10*s*. 4*d*. In the course of the evening a subscription list was opened, and there is every probability that the deficiency will shortly be liquidated.

Lincoln.—The Nineteenth Annual Report of the Lincoln and Lincolnshire Mechanics' Institution has just been published, from which it appears that the number of members has varied little during the last ten years; although the population has increased about 4,000, the reading body has not been augmented. It having been suggested to the Committee that the introduction of daily and weekly newspapers would not only extend the existing means of acquiring information, but also result in an addition of members, they consulted with some neighbouring Institutions on the subject, and have now determined to adopt the suggestion. The abstract accounts show an income of 213*l*. 4*s*. 2*d*., and an expenditure of 168*l* 14*s*. 3*d*.—leaving a balance of 44*l*. 9*s*. 11*d*. in the hands of the Treasurer.

Longton.—The Annual Meeting of the members of the Athenæum and Mechanics' Institution, was held on the 20th ult., in the New Town-hall; Mr. Bateman in the chair. The report presented was of an extremely gratifying and encouraging character. In accordance with resolutions of the last annual meeting, trustees had been appointed,—the librarian made personally responsible for the safe custody and delivery of property under his care,—and an insurance from loss by fire effected. During the year, also, the Institution had entered into union with several literary, scientific, and mechanics' institutions, from which alliance advantages had already accrued, and more important ones were anticipated. The library had received an addition of 130 volumes; and upwards of 5,000 books and periodicals had been issued to members at their own residences. The cash account quoted the receipts at 213*l*. 14*s*. 10*d*., and disbursements 178*l*. 14*s*. 8*d*; leaving 35*l*. 0*s*. 2*d*. as balance in hand. A statement of operations in the Longton Branch School of Design was also read,—the two Institutions being associated, and under the same Committee of management. The election of officers was then proceeded with. The Hon. F. L. Gower, M.P., and H. Minton, Esq., were added to the list of presidents. In moving the re-appointment of the honorary secretary, Mr. G. L. Robinson offered a well-merited tribute of praise to the ability, zeal, and uniform courtesy displayed in his official capacity by Mr. Goddard, who had been connected with the Institution from its infancy, and to whose efforts it was mainly indebted for its present mature and prosperous condition. The following resolution, submitted by Mr. G. L. Robinson, was approved by a majority of the meeting: "That a sum of 20*l*. be appropriated out of the funds towards the formation of a reserve fund, for the future purposes of the Institution, to be under the control of the members at a general meeting, and in the meantime invested as the Committee in their wisdom may determine."

Nottingham.—The Annual Meeting of the members of the Mechanics' Institution, for the election of officers and the transaction of other business, was held on Monday the 24th ult., Mr. A. Morley, Vice-president, in the chair. The Report, which was read by the Honorary Secretary, Mr. E. Renals, entered very fully into the particulars of the several departments of the Institution—its Library, Lectures, and Expenditure—and was unanimously adopted. The ballot for officers followed.

Radcliffe Bridge.—The Second Annual Meeting of the members of the Radcliffe and Pilkington Lyceum and Mutual Improvement Society was held on Monday evening, the 10th inst. It appears that in consequence of the unfortunate difference between the mill operatives (who compose the greater portion of the members) and their employers, the classes for instruction had been discontinued for some months; yet the reading-room had been generally well attended. The Directors, however, hope again to resume the usual course of instruction, and thereby carry out the principles of the Institution with advantage to the class sought to be benefited, and with satisfaction to themselves. R. N. Philips, Esq., of the Park, Pilkington, was elected President.

**Royston Mechanics' Institute.**—On Tuesday and Wednesday, the 11th and 12th ult., two lectures on "Music as applied to Religion," were delivered for this Institution by Charles Steggall, Esq., Mus. Doc. Trin. Coll. Cambridge, Secretary of the Bach Society, &c. The lectures were historical, of a most instructive and interesting character, and they were listened to with great attention by large and respectable audiences. The period allotted to him being so short, Dr. Steggall could do no more than give a brief sketch of music as connected with religion from the earliest ages to recent times. The vocal illustrations were performed by the members of the Royston Choral Society, whose services were gratefully acknowledged at the conclusion of the lectures by Dr. Steggall.

**Sudbury.**—On Tuesday evening, 25th ult., the Rev. J. C. Coleman delivered a very instructive Lecture "On the Danes in England, a chapter in the History of our own Land." The Rev. lecturer entered fully into the ancient mythology of the Scandinavians, the manners and customs of the early inhabitants of Northern Europe, the several invasions of England by the Danes, and showed that in our character, language, customs, names of places, &c., there were undoubted proofs of Danish origin; concluding with an earnest hope that every one would seek after truth by diligent reading, and endeavour to learn something of the history of their own country.

**Swindon.**—The Annual Soirée of the Mechanics' Institution was held on Friday last, in the large room of the Great Western Railway Company's works, and was attended by nearly the entire community of this great centre of manufacturing industry, who form quite a colony of mechanics in the midst of an agricultural population, and exhibit the contrast of character usually observable in such cases. The great point of attraction was a collection of models of machines in motion, the work of certain of the men during their leisure hours.

**Tenterden.**—Two lectures, in connection with the Mutual Improvement Society, were delivered, "On Nineveh," by the Rev. C. Kirtland of Canterbury, on Tuesday and Wednesday evenings, 25th and 26th January. Numerous diagrams were suspended in the room, representing the scenes and labours of Layard and others, and illustrating the habits and customs of the Assyrians. The object of the lecturer was, to exhibit the historical value and trustworthiness of the Scriptures as a WHOLE, in opposition to what is popularly termed infidelity. The lecturer gave great satisfaction to a numerous audience on both evenings.

**Thame.**—A lecture on Moral Philosophy was recently delivered to a large and highly respectable attendance of the members and friends of the Mutual Improvement Society, by H. Lupton, Esq. The lecturer detailed the opinions of Plato and the ancients on the subject, comparing and contrasting them with the morality of the Bible. Instances of individuals famous in ancient and modern times for great virtues or great vices were adduced in illustration. The lecturer concluded with a lengthened application of sound principles of morals to the whole circle of human relationship and obligation.

**Wandsworth.**—The First Soirée of the members and friends of the Literary and Scientific Institution was held on Tuesday, the 18th ult. The chair was taken by the Rev. H. Moseley, who, in a most impressive speech, pointed out the great benefits likely to occur to society at large from Mechanics' and similar Institutions. In the course of the evening short speeches were made by Dr. Longstaff, Mr. A. Coleman, Mr. H. Gore, Mr. D. Nicholson, Mr. M. Blackmore, Mr. R. Speed, and Mr. C. Pearson,—the latter of whom, at the request of the meeting, gave a short explanation of his Central Railway Terminus and City Improvements. illustrated by some valuable models and diagrams. A most extensive collection of interesting objects was exhibited, many of which were working models; and a serie, showing the difference of gas attracted much attentions as did also some photographs and other works of art, Between 400 and 500 persons attended, and all expressed themselves much gratified with the entertainments.—The rooms were again opened on the following Friday.

**Wandsworth.**—The Second Series of Lectures of the present Session of the Literary Institution commenced on Tuesday, the 25th ult., when a lecture was delivered by Mr. H. Gore, "On the Engineering Achievements of the Nineteenth Century." In introducing the subject the lecturer took a hasty glance of the works of the Ancients, especially the roads and aqueducts of the Romans. He then briefly alluded to some of the castles and bridges built during the Middle Ages, pointing out the peculiar ability displayed in their construction. In treating on the immediate subject of the lecture, Mr. Gore gave a detailed account of the most important docks, tunnels, breakwaters, bridges, &c., completed during the present century; also a particular description of the mode of constructing the principal railways. In referring to the application of iron to various engineering structures, a lucid description was given of the Britannia and Conway tubular bridges. Under the division of mechanical engineering, the lecturer described several interesting machines, and among them the steam-hammer. The principal points of the lecture were admirably illustrated by the aid of a great number of splendid diagrams, prepared by the lecturer expressly for the occasion.

**Workington.**—The Annual General Meeting of the members of the Mechanics' Institution was held on Tuesday evening, the 25th ult. After a Report, showing the favourable progress of the Institute, and a statement of accounts for the past year had been read, the Rev. H. Curwen was unanimously re-elected President; and W. L. Dickenson, Esq., C. Brown, Esq., T. Falcon, Esq., with the addition of C. Lamport, Esq., were re-elected Vice-presidents; Mr. John Fisher was chosen Treasurer; and the following members were then balloted for the Committee: Mr. Thomas Harrison, Mr. J. W. Russell, Mr. J. Peat, Mr. J. S. Fawcett, Mr. J. Hornsby, Mr. J. Carter, jun., Dr. A. Peat, Mr. J. Jackson, and Mr. J. Penrice, jun.;—these were all re-elected. Mr. J. Askew and Mr. W. Thompson, jun.; Mr. H. Bowes and Mr. J. Cape were re-elected Auditors. The Library contains above 1,000 valuable and well-selected volumes, and the reading-room is well supplied with daily and other newspapers, periodicals, &c.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

A neat Case, for holding the Numbers of the Journal for half a year, is now ready, and may be had of the Publisher, 186, FLEET-STREET, price 1s. 8d.

### QUESTIONS FROM CORRESPONDENTS.

*Green Walls.*—Can any of your correspondents tell me of an effectual mode of preventing the growth of confervæ on walls, covered with cement, in damp situations? I have made several unsuccessful attempts to prevent cement from becoming green under these circumstances. [No. 29.]

*Glenfield Starch.*—What is the process used in the preparation of Glenfield Patent Starch, and when was the patent taken out? [No. 30.]

### ANSWERS TO CORRESPONDENTS.

*Book-indexing.*—In answer to correspondent (No. 28), I beg to state that there is no objection to colouring the edges of directories, or other works of reference, different hues, save a slight increase in the cost of binding. It has often been done. Letter-press printing has been attempted upon the edges of volumes, but without success. Letters may be impressed (singly) upon the edges of books by the binder, as upon the backs.

*Brewing.*—Have any attempts been made to condense and save the large quantity of aromatic vapour given off during the boiling of beer? It is evident from the very fragrant odour of the steam which escapes from breweries, that a considerable part of the volatile flavouring matter both of the hops and of the malt is lost. [No. 31.]

*Rendering Fats.*—When were steam tanks first introduced into the manufacture or rendering of fats; were they employed before the date of E. Wilson's patent, either in America or elsewhere; and has any important improvement in the make or working of them been subsequently made? [No. 32.]

*Red Ebony.*—In the South African Department of the Great Exhibition, there was a small specimen of a hard red wood named red ebony, which seemed well suited for turnery purposes, and which I see by the Jury Report was deemed worthy of a prize medal; I cannot meet with this wood at any of the dealers, and should feel obliged for any information as to where it may be procured? [No. 33.]

*Printers' Types* (No. 27).—The Patent Wire Type Company exhibited at the Crystal Palace type formed by mechanically compressing wire, and not by melting the metal, as in the ordinary process of type-founding. Wire type is stated to be much more durable than ordinary type. I send you a few words printed from the Company's type; their office is at No. 1, Guildhall-chambers, Basinghall-street.

## MISCELLANEA.

**NEW CRYSTAL PALACE, SYDENHAM.**—During the late discussions on Patent Law Reform, both in and out of Parliament, much stress was laid on the want of some permanent place where models, machinery drawings, specimens, &c., of new inventions, might be deposited for exhibition. It was felt on all sides that such depositary was of great importance both to inventors and the public generally. We, some time since, noticed that the Crystal Palace Company had taken this subject into consideration, and had determined to organize a department in their building to supply this want. It is gratifying to know that most satisfactory arrangements are being made for the purpose, and the "Court of Inventions" promises to form not only a very attractive, but a very useful and instructive portion of the varied display. Everything, so far as we can learn, is being done to render this Court appropriate for models, &c., and perfectly free from damp or wet. The experience of the defects of the old but temporary building in Hyde-park has been most valuable on this head, whilst the permanent character of the present building, the improvements adopted in the glazing and other matters, make the task of remedying them comparatively easy, and there is no reason to doubt that the Court of Inventions can and will be perfectly dry, and in every way adapted for the reception of the most delicate models.

**LECTURES TO WORKING MEN.**—The Professors at the Government School of Mines, last year, commenced the experiment of delivering a set of Lectures to Working Men, which were exceedingly popular. It has been thought advisable this session to give more completeness to the system; so that some considerable amount of instruction in the sciences might be communicated to the artizans. Thus it has been arranged, that a course of six lectures shall be given on the "Applications of Physical Science;" and two courses of six each, on the "Elements of Geology and of Natural History." The admission to these lectures is obtained by each man paying a registration fee of sixpence, at the time of entering his name and trade, for each course. This sum is not nearly sufficient to defray the ordinary expenses of each lecture. The duties of the lecturers are voluntary and entirely gratuitous; the only reason for the registration fee being to ensure the attendance of such men only as are desirous of profiting by the information given.

## PATENT LAW AMENDMENT ACT, 1852.

Our readers are aware that by the late Act it is provided that the Commissioners of Patents shall cause to be printed, published, and sold, all specifications, &c., deposited or filed in their office; provisional specifications not till after the expiration of the period of protection, but all other specifications *as soon as conveniently may be* after the filing them. Now, although there have been filed between thirty and forty complete specifications, and some of them so long back as the month of October last, not one of them has yet been printed. There is no valid reason for this neglect, unless it be the faulty constitution of the Commission, there being but one permanent member, all others changing with a change of government. Every specification might, without any difficulty (except perhaps in some few instances), have been at once placed in the printer's hands, and by the end of a week after its filing, the printed copy might have been published and sold. They should be printed of a uniform size, convenient for use, and not in the old-fashioned, clumsy official Act of Parliament and Blue Book size; and if paged consecutively, might be bound up in a volume, with index and title-page, as soon as a sufficient number are issued. This should have been done at once. If the provision was considered of such importance as to be inserted in the act (and we believe it a very valuable and important provision), why are the public deprived of its benefit? "As soon as conveniently may be," must not be interpreted "as inconveniently as possible for the public." Although the number of specifications filed is small at present, yet in a few months they will necessarily pour into the office in scores, and unless some provision for their printing is very shortly made, and the matter put in train, very considerable inconvenience must arise from the neglect. There have been already received from fees in respect of patents not less than 12,000*l.* under the new act, and the public will not be slow to believe that they have some claim in return, to have the Patent Act fairly and efficiently carried out.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 28th Jan.*, 1853.

*Dated 6th Jan.*, 1853.

40. W. Beales—Fire-proof cement.

*Dated 7th Jan.*

46. W. C. Scott—Improvements in wheels.

*Dated 8th Jan.*

59. F. Parker—Improvements in boots and shoes and spatter-dashes, termed antigropelos.

*Dated* 11*th Jan.*

69. J. Beattie—Economising fuel in generating steam.
71. H. C. Jennings—Separating fluid parts of fatty and oily matters.
73. J. R. W. Atkinson—Machinery for spinning flax, &c.
75. J. Petrie and S. Taylor—Apparatus for washing wool.

*Dated* 12*th Jan.*

77. J. M'Dowall—Cutting and reducing wood, &c.
79. J. Hick—Lubricating revolving shafts and their pedestals.
80. J. Fletcher—Machinery for spinning, &c., cotton, wool, &c.
81. W. B. Nation and J. Dyer—Manufacture of soap.
83. G. A. Huddart—Manufacture of artificial leather.
83. W. Nairne—Reeling yarns.
86. E. Haslewood—Firearms and projectiles. (A communication.)
87. J. Cupper and T. J. Watson—Bleaching jute, &c.
89. J. Bennett and C. Charlesworth—Improvements in doffing and preparing rovings of wool.

*Dated* 13*th Jan.*

90. M. Cartwright—Manufacture of gypsum.
92. W. Brown—Treating coal, &c., and their volatile products.
93. J. Rumley—Improvements in pumps.
94. E. W. Wren—Manufacture of bricks, pipes, tiles, imitation stone and peat, bricks for fuel, by means of a machine entitled, "A Central Circular and Horizontal Motion."
95. G. Fife, M.D.—Protecting vessels and surfaces from injury and decay.
96. J. W. Wilkins—Electric telegraphs.

*Dated* 14*th Jan.*

97. J. Lillie—Machinery for malting, drying, and seasoning grain, &c.
98. R. Taylor and H. H. Salt—Manufacture of spoons and ladles.
99. A. James—Improvements in means of inclosing needles.
100. J. H. Vries, M.D.—Motive power.
101. W. Steads—Blinds, maps, &c., wound on rollers.
102. F. J. Bramwell and J. Baggs—Machinery for driving piles, hammering, stamping, and crushing.

*Dated* 15*th Jan.*

103. J. S. Kincaid—Registering numbers entering and quitting omnibuses, &c., and other places.
105. E. Tasker—Writing and drawing tube.
107. J. H. Young—Brooms and brushing apparatus.
108. P. A. Halkett—Improved construction of inkstand.
109. J. Arrowsmith—Pumping machinery.

*Dated* 17*th Jan.*

110. T. Potts and J. S. Cockings—Manufacture of tubes, &c.
111. T. C. Ryley and E. Evans—Wrought-iron wheels for railways, &c., and the machinery for same.
112. A. Yorston—Construction of railways.
113. W. Nairne—Improvements in power-looms.
114. A. E. L. Bellford—Manufacture of "batting," or "wadding." (A communication.)
115. A. E. L. Bellford—Blocks for printing music. (A communication.)
117. H. H. Henson and F. Henson—Signalizing on railways, &c.
118. A. E. L. Bellford—Motive power.

*Dated* 18*th Jan.*

119. C. Binks—Electric light.
120. J. T. Manifold and C. S. Lowndes—Improvements in steam-engines.
121. H. Browning—Compositions for coating iron, ships' bottoms, &c.
123. O. Reeves—Manufacture of manure.
124. A. V. Newton—Improved sewing machine.
125. P. Fairbairn and S. R. Mathers—Machinery for drawing sliver and rove of flax, hemp, and tow.
126. T. S. J. and T. Lees—Apparatus for admitting water to boilers.
127. J. Sherringham—Improvements in stove-grates.
128. R. Neale—Improvements in process of copper and other plate printing, and in inking, wiping, &c.

*Dated* 19*th Jan.*

130. S. Smirke—Signals on railways.
132. W. F. Snowden—Improved mangle.
134. T. Judge—Propelling vessels.
136. J. Maudslay—Improvements in steam-engines, applicable to pumps, &c.

### APPLICATIONS WITH COMPLETE SPECIFICATIONS FILED.

145. G. E. Gazagnaire—Manufacture of fishing-nets. (A communication.) Jan. 20, 1853.
182. W. F. Shattuck—A smut-machine. (A communication.) Jan. 25, 1853.
184. T. Ovans—Manufacture of boots. Jan. 25, 1853.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 27th Jan.*, 1853.

384. Joseph Henry Tuck, of Pall Mall—Improvements in stuffing-boxes, and in packing to be used in stuffing-boxes, bearings, pistons, and valves.
456. Anthony Liddell, of Canterbury—Improvements in stuffing-boxes, and in packing to be employed with stuffing-boxes and pistons.
716. Richard Barnes, of Wigan—Improvements in cocks or plugs for water or other fluids.
758. William Edward Newton, of 66, Chancery-lane—Improvements in knitting-machinery. (A communication.)

*Sealed 29th Jan.*

62. John Sayers, of 6, Prospect-place, Poplar—Improved arrangements for maintaining a level surface or level surfaces upon or in connection with bodies subject to a rocking motion.
233. William Crook, of Blackburn—Improvements in looms.
378. Preston Lumb, of Vauxhall—Improvements in apparatus for cleansing coal.
587. James Rock, the younger, of Hastings—Improvements in railway carriages.
721. Caleb Bloomer, of West Bromwich—Improvements in the manufacture of anchors.
895. Emile Martin, of Paris, and 4, South-street, Finsbury—Improvements in the mode of extracting gluten from wheat, and for preparing and drying the same by mixing to several degrees of concentration.
915. Samuel Clark, of 55, Albany-street, Regent's-park—Improvements in lamps.
932. William Taylor, of 16, Oxford-terrace, Hyde-park—Improvements in propelling ships and other floating bodies.
962. William Maugham, of Ilfield-terrace, Surrey—Improvements in rendering wood fireproof.
991. Thomas Lovell Preston, of Birmingham—Invention of a machine for making links for chains.
1011. Edward Thomas Loseby, of Gerrard-street, Islington—Improvements in the construction of timekeepers, and in cases to be applied thereto.
1013. George Collier, of Halifax, Yorkshire—Improvements in the manufacture of carpets and other fabrics.
1022. Thomas Boardman, of Pendleton—Improvements in looms for weaving.
1031. George Dixon, of Birmingham—Improvements in the manufacture of and refining sugar.
1036. Josiah Glasson, of the Soho Foundry, near Birmingham—Improvements in boilers.
1045. Henry Clayton, of the Atlas-works, Upper Park-place, Dorset-square—Improvements in the manufacture of bricks.
1051. John Webb, of Coventry—Improvements in ornamenting enamel watch-dials.

*Sealed 2nd Feb.*

767. John Ramsbottom, of Longsight, near Manchester—Improvements in steam-engines.
978. James Smith, of 2, Little Canterbury-place, Lambeth-walk—Improvements in paving roads and other surfaces.
994. Henry Jenkins, of 11, Spencer-street, Birmingham—Improvements in the manufacture of bracelets, brooches, and other articles of jewellery.
1000. James Lawrence, of Westminster—Improvements in the manufacture of projectiles.
1012. Charles Greenway, of Cheltenham—Improvements in anchors.
1032. Timothy Morris, of Birmingham, and William Johnson, of Warkwood-heath, near Birmingham—Improvements in depositing alloys of metals.
1034. John Thomas Way, of Holles-street, Cavendish-square, and John Manwaring Paine, of Farnham—Improvements in the manufacture of glass.
1044. David Napier, of Millwall—Improvements in steam-engines.
1046. William Henry Fox Talbot, of Lacock Abbey, Wiltshire—Improvements in obtaining motive power.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Jan. 27 | 3414 | Onion's Improved Extra-blast Telegraph Wire-welding Forge. | John C. Onions | Bradford-st., Birmingham. |
| „ 28 | 3415 | Stokes's Portable Camera. | Philip H. De la Motte | Chepstow-pl., Westbourne-gr. |
| „ „ | 3416 | Ploughshare. | William Leggett | Derrythorpe, Lincolnshire. |
| Feb. 1 | 3417 | An Improved Pole and Bolster for Railway and other Trucks. | William Eassie | Gloucester. |
| „ „ | 3418 | A Sight for Rifles, Pistols, &c. | Witton, Daw, and Co. | 57, Threadneedle-street, City. |

# SOCIETY OF ARTS.

## FRIDAY, FEBRUARY 11th, 1853.

## EXTRAORDINARY MEETING,

### *Tuesday, February 8th,* 1853.

An Extraordinary Meeting of the Society was held on Tuesday, the 8th inst., Sir John P. Boileau, Bart., Vice-President, in the Chair.

The names of seven candidates for membership were read.

The Chairman read a letter from Lord Carlisle, and from several other Noblemen and Gentlemen, expressive of their regret at not being able to be present. He also read the following letters from Sir John Pakington, Bart, and Elihu Burritt.

Eaton-square, February 5th, 1853.

Sir,—I fear I shall be unable to attend the meeting on the 8th instant, to which you have done me the honour to invite me in your note of the 3rd inst., but I greatly desire to see a system of cheap postage established between this country and our Colonies.

When I was at the Colonial Department, I pressed upon the Postmaster-General my opinion of the great importance of conceding this boon; and if I had continued in office, it was my intention to make every exertion to effect it.

I shall be happy to co-operate with your Council in any manner in my power, and I trust the present Government may be induced to attach as much importance to the subject as I did.

I consider it to be a great national object, the interest of which is daily increasing.

I am, Sir, your faithful Servant,
John S. Pakington.

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Dublin, February 7th, 1853.

Dear Sir,—I have just received here the circular note of invitation to the Meeting of the Ocean Penny Postage Association, on the 8th, which you have kindly addressed to me. Most gladly should I have attended this important meeting had I been in London, or within any reasonable distance from it. But I have just arrived in this city, *en route* to all the considerable towns in Ireland, for the purpose of presenting the project of cheap or Penny Ocean Postage between Great Britain and all other countries on the globe. As I had developed this subject in public meetings in nearly all the large towns in England and Scotland, I felt it desirable that the people in this part of the kingdom should be interested in the question, which is of peculiar importance to their well-being. At the conclusion of every meeting, a petition to Parliament in favour of Ocean Penny Postage is adopted and signed. I have now presented the project in this way in about 120 of the most considerable towns in Great Britain, and it has been received with great favour everywhere. We have a large number of petitions ready for presentation to Parliament, all asking the simple boon of an Ocean Penny Postage. Mr. T. M. Gibson has agreed to bring forward a motion in the House of Commons in behalf of this measure, and Mr. Adderley has engaged to second it. I hope that your magnanimous and magnificent scheme of Colonial Postage may be harmoniously blended in Mr. Gibson's motion, so that both may be fully and advantageously included in it; so that it may be asking the establishment of an Ocean Penny Postage between Great Britain and all FOREIGN countries, and the extension of the *present inland penny postal* system of the home country to all the Colonies and dependencies of the British empire. Thus all our operations may be concentrated upon one motion. I earnestly hope that this may be agreeable to the members of your powerful Association.

Yours truly,
Elihu Burritt.

Mr. Yapp then read a paper on "The Proposed Reforms suggested by the Colonial and International Postage Association," of which the following is an abstract:

There are few subjects perhaps of interest to a larger number of people than that of postage. It cannot be said to be exclusively a commercial, a literary, or a scientific question. It appeals to all classes of society, whether engaged in commerce, literature, or the arts. It appeals to our feelings as well as to our interests. It is a matter which deeply concerns the manufacturer and the merchant; and it is no less interesting to all who are united by ties of affection or sympathy to others, from whom they are parted by distance.

Facilities of communication of all kinds are sure tests of the progress of civilization, and of the development of the resources of a country. Seventy years ago the mails were carried through England on horseback, at the rate of three and a half miles an hour, and when Mr. Palmer (the Rowland Hill of that day), proposed the establishment of the mail coach system, the Post-office authorities of the time thought that the pace was quite as fast as was requisite, and could not see the use of hastening the mails.

The mail coach system, however, was established, notwithstanding the authorities, and there were few things that Englishmen were much prouder of than the mail coaches, which, a few years afterwards, ran in all directions, from St. Martin's-le-Grand.

Railways have superseded the mails, and the letter that used to be a week, or even a month, reaching the remote parts of our own country, and cost 16*d*., now flies there while we are in bed, and costs us but one penny.

Mr. Rowland Hill's proposal to establish, in place of the varying scale then in operation, an uniform charge of a penny for a single letter, irrespective of distance, was at first received as the dream of an enthusiast, and met with as much ridicule as applause.

The idea was new, or, at any rate, it was new to the public, and the project laboured under a difficulty, which fortunately no longer exists. No positive data *then* existed by which to test the soundness of the scheme—*now* we have the benefit of the experience which has resulted from the working of the penny postage system, and can advocate cheap and uniform colonial and foreign postage, on the grounds of the great success and immense national advantages which have followed the adoption of the system in this country.

To form any notion of the effect of penny postage, it is necessary to take a glance at the Post-office, previous to the alteration of the system.

By reference to the Third Report of the Postage Committee of 1838, it will be seen that for seventeen years previous to the inquiry, although the population and trade of the country had been increasing rapidly, the revenue of the Post-office had been nearly stationary, in fact, from 1815 to 1823, it had been on the decline; the gross revenue in the former year having been £2,323,835, while in the latter it only reached to £2,071,503.

At page 11 of the above Report is a return, showing that in seventeen years, ending with

1837, the income had only increased £60,827, or 3*s.* per cent. per annum.

The twelve years of the new system exhibit results which contrast remarkably with the above. The gross revenue of the Post-office in 1840, the first year of the penny postage, was £1,359,466; that of 1851, £2,422,168; an increase of very nearly £100,000 a year, and a larger total by some thousands than had ever before been obtained from postage.

To complete this slight sketch of the growth of the income of the Post-office, it must be noted that a very large proportion of the expenses of management is caused by the newspapers (amounting in 1849 to 65,500,000), which pass through the post without contributing anything to the funds of that department.

The £350,289 collected in newspaper stamps ought, in fact, to be carried to the credit of the Post-office.

It is quite impossible to exhibit by figures what cheap postage has done for the trade and commerce of the country, or to estimate the influence which it has exerted upon literature, science, art, education,—in short, upon all those great and important items which together constitute civilization.

Some idea of these effects may, however, be derived from the fact that the number of letters which passed through the post in 1838 was under 76,000,000, while last year they amounted to about 400,000,000.

But we are not confined to our own country for proofs of the importance of cheap postage. Nearly all the civilized world has followed our example either entirely or in part. France, Spain, Belgium, Prussia, Holland, and Bavaria, have all made great reductions in their postage charges. Russia has for some years established a uniform rate (equal to about 4d. of our money) over the whole extent of that enormous empire. The United States charge three-halfpence for a single letter for any distance not exceeding 3,000 miles; and we find, by the Report of the Post-master General, that the number of letters has increased from 24,000,000 in 1843, to 83,000,000 in 1850.

In our own possessions in India a reduction equivalent to about fifty per cent. was made in 1839. The effect of this reduction, as we find by the Report of the Commissioners appointed by the Government at Calcutta to inquire into the subject, was to cause an increase of the number of letters, during the first year, of 100 per cent., and in nine years of 150 per cent.

Since the establishment of the penny postage in the United Kingdom, the internal trade of this country has greatly increased; so also has our export trade, and to an extent not contemplated by the most sanguine speculators. The exigencies of this multiplied commerce have been partially met by the establishment of ocean steamers, which have practically reduced the distance, and strengthened the ties between us, our colonies, and our neighbours; and it has been for some time the opinion of practical men that the principle of low and uniform postage charges was equally applicable to ocean as to inland postage, and would, if applied to foreign and colonial correspondence, produce similar results to those which have flowed from its adoption in the former case.

With this object in view, an Association was formed within these walls in 1851, including the representatives of many foreign nations at the Great Exhibition, which had shown to enlightened men of all nations how much each could learn of the other, and of what vast importance it was to remove all obstacles to free communication.

After mature consideration of the course to be pursued, the Association, looking at the greater difficulties which stand in the way of an alteration of Foreign Postage arrangements as compared with Colonial, and feeling that example in such matters is infinitely more efficacious than precept, have resolved to give their attention for the present to that portion of the subject which relates to our own possessions abroad.

There is another and a most important circumstance also, which has helped to this decision, namely, the extraordinary emigration which is now carrying 1,000 of our countrymen daily from our shores to the antipodes:—such a migration is without parallel in history, and the growth of the Colonies towards which this vast tide of human beings is directed, is equally unprecedented.

A colonization so unparalleled calls for extraordinary means of correspondence, and nothing can be of more importance in cementing the interests of the Colonies and the mother country than such a postal system as shall make the cost of a letter no impediment to its being sent upon the most trifling occasion, not only by the merchant or tradesman, but by the poorest emigrant just landed on the Australian shore, or by the anxious mother, wife, or sister of him from whom the ocean separates them for a time, or even perhaps for ever.

At present, the postage on a letter to our foreign possessions varies from 8d. to 1s. 10d., the average being about a shilling. There are two rates to each Colony, according to whether the letter be sent by private ship or by packet; in some cases the letters must be prepaid, in others it is optional; while from some of the Colonies letters cannot be prepaid under any circumstances; and lastly, there is this vexatious fact in addition, that, whatever the charge here, a writer knows not how much his correspondent will have to pay before the letter will be given up to him.

The printed accounts relative to colonial, as distinguished from foreign letters, are very unsatisfactory; but it may be seen by a statement obligingly furnished by the Postmaster-General, and printed in the Journal of this Society, of the 10th of December, and especially by reference to an extract from that Report, published in the same Journal on the 14th of January, that the total gross income from colonial correspondence is less than 200,000*l.* per annum: thus, supposing the average postage to be one shilling, we have less than 4,000,000 of colonial letters, or a hundredth part of the total number of letters passing through the Post-office during the year. That these are all the letters that pass annually between the United Kingdom and the whole of the British possessions abroad, India included, is quite incredible; it is perfectly well known that the number of letters which are conveyed to the Colonies by other means is very considerable, amounting, according to some estimates, to four times as many as go through the Post-office.

That the postage should be reduced, and a remedy found for the anomalies, inconveniences, and evasions which exist, is admitted by every one, although there will doubtless be some diversity of opinion as to the exact plan to be adopted.

But the satisfactory results of the Inland Penny Postage system would seem to point at once to the adoption of a *very low uniform* rate, together with *pre-payment*, or, in other words, to *Colonial Penny Postage*, and the use of *stamps*, as in the United Kingdom.

If it be objected, that it would be unjust to charge the same for a letter going to Australia as for one going into the next town, or even into the next street, the answer is, that it is quite impracticable to arrange the charge in exact proportion to the distance travelled and the duty performed; that the extra cost incurred by distance is so small as to be scarcely appreciable, while the preparation of the mails and the delivery of the letters is the same in all cases; that the proposed rate of one penny per half-ounce would be equal to 300*l.* a ton, supposing all letters were full weight; and lastly, that the simplicity of a uniform penny rate would be of such great practical importance, as to outweigh all other considerations.

Such a rate of postage to the Colonies would not be without precedent. From the year 1819 to 1838 the postage to Ceylon, Mauritius, the East Indies, or the Cape of Good Hope, by private ship, was only twopence per letter, up to three ounces in weight.

And it must not be forgotten that books, pamphlets, and even MSS., can be sent at the rate of 6*d.* for 8oz., to nearly all our Colonies, while a 2oz. pamphlet, or a newspaper of any weight, can be sent to the United States of America for 1*d.*

In the discussion of this subject frequent reference is made to the fact that Government expends upwards of 800,000*l.* a year for the packets in which part of the ocean mails are carried; and it is argued, that therefore a lower postage is not advisable on financial grounds. It is well known, however, that the subsidies are paid for other very important objects besides the conveyance of the mails, and consequently the whole cost of these packets is charged by Government, as it ought to be, not to the Post-office account, but to that of the *Admiralty.* If the packets were maintained solely for the purposes of the Post-office, the sum of 240,000*l.* per annum would certainly not be paid for the West Indian packets, which do not, and could not have been expected to earn more than a tenth-part of that sum.

In a financial view the point to be considered is, how would the proposed alteration affect the *actual income* from Colonial letters. That has already been stated as being less than 200,000*l.* per annum, just equal to the increase in the net income of the Post-office in 1851, as compared with 1850. This is the whole amount that could possibly be endangered by the change.

The Author then entered at length into the reasons why a Colonial Penny Postage should be established, and said, in conclusion:—Looking at all these facts, is it fair to suppose that the amount of colonial postage would be reduced one half? And that sum is less than the average annual increase in the general income of the Post-office for the last thirteen years; and therefore such a reduction could not be looked upon as an actual sacrifice of revenue, but only, at the most, a temporary check to a rapidly growing *increase* of revenue.

Besides, it must not be forgotten, that revenue is not the main object of the Post-office. For, in the words of the Commissioners of Post-office Inquiry, "The safe and speedy conveyance of letters for the benefit of trade and commerce, was the primary consideration with the Government in the establishment of the General Post-office."

This also was the reasoning of the Committee of 1838, and the adoption of Penny-postage was the result.

Is not the demand for a Penny Colonial Postage equally logical and practical, when it is seen that its establishment could not possibly cause any reduction of the present net revenue of that department?

Sir J. Boileau pointed to the advantages which had resulted in this country from the establishment of penny postage. Formerly, he said, when the children of the poor were sent to service, 100 or 150 miles from their homes, so high was the rate of postage, that they did not think of keeping up a regular correspondence with their parents. The small amount of education which they had received they gradually lost, and in a few years they lost all those domestic affections which, after all, were the root of the moral virtues. Cheap postage tended very much to foster and spread education amongst the masses.

Mr. Moffatt, M.P., said, the original intention of Mr. Rowland Hill was, that the penny postage system should apply to the Colonies as well as to the United Kingdom; but as it was supposed that the opposition to postage reform would be diminished by limiting its object to the United Kingdom, agitation for reform, with regard to the Colonies, was postponed. The results of the establishment of the penny postage system for the United Kingdom were a great triumph for Mr. Rowland Hill, and ought to urge all to support the efforts of this Association to extend the benefits of a cheap and uniform rate of postage to the Colonies. Under the present high-priced system, the number of letters reaching us from India and the whole of our Colonies in a year was no more than passed through the Post-office at home in a week. As a mere matter of policy, we ought to reduce the postage to our Colonies, in order to give free scope to the feelings of affection entertained by the emigrants to those Colonies, and the relatives whom they had left in this country. That would be amongst the most effectual means of binding the Colonies to this country. England had set an example to the whole civilised world with regard to the postage system; and it behoved her to be consistent, and carry out her postage reform to the utmost extent. Mr. Moffatt concluded by moving the following resolution:

"That it would be sound national policy to abandon, if necessary, even the whole of the present postal revenue derived from the Colonies and the British possessions, which is about 200,000*l.* per annum, in order to promote the commerce, education, freedom of communication, and friendly relations between the Colonies and the mother country."

CAPTAIN OWEN, R.E., seconded the resolution. He said that the three great principles which should guide the Postage Association were, *pre-payment*, *uniformity*, and *cheapness*. He warmly advocated the adoption of uniform penny postage to all our possessions abroad. As to the proposed rate of one penny for a letter to any of our colonies, he said: At the present moment, the freight to Australia was 15*l.* per ton. It was thus high, no doubt, in a great measure, in consequence of the scarcity of seamen. Now, 70,400 half-ounce letters only amounted to a ton, and at the rate of 15*l.*, the freight on each letter would be no more than a twentieth of a penny. This, he thought, disposed of the objection that it was absurd to ask the Government to carry a letter to Australia as cheaply as to any part of the United Kingdom.

Mr. SAMUEL SIDNEY supported the resolution; he believed that the present Government would not be unfavourable to the establishment of cheap and uniform ocean postage, provided they were assisted by a little gentle pressure from without.

Mr. FOSTER (of Port Phillip), said he was of opinion that it was of the utmost importance to the safety of this country that a copious stream of emigration should continually flow from her to her colonies. The surest means of sustaining that stream would bo to afford to the poorer classes of this country means of being informed of the great advantages they might derive from emigration to the colonies. He thought it desirable that a communication should be entered into with the colonial governments upon the subject which they had met to consider that evening. It was as much for the advantage of the Colonies that a cheap system of postage should be carried into effect as it was for the mother country, and he felt assured that they would gladly aid in the promotion of so desirable a project.

After a few words from Mr. Collett,

The first resolution was put by the Chairman, and unanimously adopted.

Mr. J. D. POWLES, in moving the second resolution, said our fellow-countrymen in the colonies had a right to call upon us for an answer why we had not permitted them to participate in the advantages which we at home had enjoyed from the penny postage reform. The resolution which he begged to move ran as follows:—"That the system of a uniform penny postage already in operation between the United Kingdom and the Channel Islands ought to be extended to the British colonies and possessions." It was the interest of England to bind her distant possessions to her as much as possible, and he knew no better mode of effecting that object than by carrying into effect the resolution which he had the honour to submit to the consideration of the meeting.

Mr. JOHN DILLON seconded the resolution. He thought that the time had come when a cheap and uniform rate of postage should be extended to our colonies. The immense flow of emigration to Australia ought at once to settle this mooted question. It was impossible that the immense mass of our fellow-countrymen in that colony could long be left without a rapid, immediate, cheap, and uniform postage.

Mrs. CHISHOLM having been solicited to say a few words, was received with great cheering, and addressed the meeting, stating that she knew from her own experience how desirable it was that a cheap system of postage should be established between the colonies and the mother country. She believed such a system to be indispensable if the social affections were to be cherished, and in support of her opinions adduced several instances of persons in the humbler ranks of life who had emigrated to Australia, and who had, in consequence of the heavy rate of postage, found themselves unable to communicate with their friends in this country.

The resolution was then unanimously adopted.

Mr. BROOKING moved, and Mr. GILLESPIE seconded a vote of thanks to Mr. Yapp, which was carried unanimously.

The Secretary announced that at the next meeting, on Wednesday, the 16th, a paper would be read by Mr. J. Sparkes Hall, "On the History and Manufacture of Boots and Shoes."

## PHOTOGRAPHIC SOCIETY.

AT the First Meeting of the Photographic Society held on the 3rd of February, Sir William Newton in the chair, the following paper was read:

We have now formed a Photographic Society with a sufficient number of members to form a good working body; it remains to render it really efficient for the purposes for which it is constituted. To attain this end, it will be useful to have a clear notion of what a Society can, and what it cannot do. It cannot then of itself advance the knowledge of the art, but it can afford a means by which its individual members may the more easily do so. It is the organised machine, but not the motive power. It can give direction and discipline to previously existing forces, and a nucleus to those which may hereafter arise.

It cannot of itself, therefore, enter into photographic researches, but it can regulate, and to some extent initiate the labours of its members; it can receive and record the results of those labours.

One of its simplest, but not least important offices, will be to define what is already known. In the works which at the present time treat of photographic subjects, our attention is constantly attracted by the announcement of new discoveries which, on enquiry, turn out to be old. There being no recognised record to which students may refer, to ascertain what has been already done, they are continually re-discovering the same facts, and wasting time in the working of unprofitable veins of ore. Next it will be a register of all new facts, and herein will consist much of its value.

Photographers are constantly meeting with accidental results, sometimes spoiling, sometimes improving their pictures; in each case, independently of any plan on the part of the operator. The person to whom these occur may and will in the majority of cases be unable to trace out the causes of such apparent accidents, but he can always make a simple statement of the circumstances under which they occurred; and so, perhaps, lay the foundation of what, in the hands of another member of the Society, may become an important discovery.

It will then be one of the great objects of the Society to get together a collection of extensive and careful observations. No doubt we shall be able in a short time to present to the attention of photographers a table of subjects upon which minute experiment is much needed for the advancement of the art.

The more varied the conditions under which these experiments are made, the more instructive and useful will be the results, and therefore it will be the especial aim of the Society to keep up a constant intercourse between itself and those of its members, who may be pursuing the practice of the art in distant quarters of the world.

That this class of members should be as numerous as possible is esteemed exceedingly desirable. The Council has therefore resolved that gentlemen residing abroad, and wishing to be members of the Society, shall pay no more than the entrance fee and subscription for the first year, remaining free from any other liability whilst absent from this country.

The principal objects of the Society being the collection and the diffusion of information, the verification and explanation of new discoveries, the comparison of processes and of their results, the improvement of the mechanical and optical machinery of the art; their meetings will be organised, and their exertions directed in such a way as best to secure these results. With this end in view, it will be advisable to divide the art into sections, and to apportion each section to the consideration of successive ordinary meetings.

Thus on one evening we may take for consideration the different processes by which photographic pictures are produced; or if too extensive a range of subject is here included, we may single out any one process, and obtaining from some member distinguished for his successful application of that process, a minute account of the method of manipulation, a statement of its advantages and disadvantages, with the means adopted to avoid the one and secure the other, proceed next to the discussion of the subject, and to receive the additional experience of those who have studied the same process.

On another evening we may consider the relation of photography to the stereoscope, and obtain a statement of the general law under which stereoscopic pictures are to be made, and the accidental conditions which render them most effective.

The different forms of camera at present in use will be a most interesting subject for examination, and one that should be brought on early, as there is none in which there is greater need of improvement.

The different forms of lenses, and the various methods of printing positive pictures, will, in their turn, be brought forward for the consideration of the Society.

If possible, the consideration of each section will be introduced by the reading by some member of the Society, of a short paper specially treating of the subject set down for the evening's discussion.

On any evening, however, the Society will be glad to receive communications referring to any part of the art or science of photography.

So far all that we have mentioned relates to the collection of information. The evening meetings will, as regards members residing in town, and able to attend regularly, serve also as a means of diffusing the information so collected. But, as a great part of our members are scattered up and down the country, no scheme of action will be complete which does not extend to them the advantages of the Society. We shall, therefore, in proportion to the means placed at our disposal, endeavour to circulate among them from time to time all that is valuable in the communications laid before the Society. A *resumé* of the proceedings of each evening will be, of course, published in all the publications which pay especial attention to scientific subjects. For the present, in addition to the general abridged report of the ordinary meetings, any interesting matter brought before the Society will be, probably, found in the columns of the *Society of Arts' Journal*. As, however, the mode in which the interests of country members will be attended to has not yet been decided upon by the Council, and will obviously depend upon the amount of means placed at its disposal, nothing more can be said at present, than that all interesting information will be circulated among country members as fully and as frequently as possible.

When the Society is in so independent and flourishing a situation as to be able to occupy premises of its own, it will probably be considered advisable to erect a laboratory and glass-house, in which experiments may be made, either at the cost of the Society for the solution of questions interesting to all the members, or by individuals for their own satisfaction, in accordance with such regulations as may be thought necessary.

Periodical exhibitions of photographic works will, of course, form one, and an important part of the Society's means of action, and one which need not be deferred till the accumulation of a large reserve of pecuniary means.

## INTERNATIONAL TELEGRAPH.

(*From a Correspondent.*)

It is under the above denomination that a Company has been formed with the view of constructing a Submarine Telegraph between this country and Holland. As this is the longest submarine line that has as yet been attempted, and also from its consequence, in forming a second distinct communication with the continent, independent of France, the importance of which, in the case of a war, is obvious, a short description of it may not prove uninteresting to your readers.

In all former submarine cables, where it was intended to employ several wires, they have been collected together under one coating of stout iron wire, the whole when completed bearing the appearance of an iron rope of a diameter varying from 1¼ in. to 2 in. In the present instance the distance to be crossed is so great, that an entire cable containing the six wires it is proposed to lay down, would weigh above 1,400 tons, which would cause much inconvenience in the operation of laying down; from this and other reasons, the Company's Engineer, Mr. Edwin Clark, has been induced to adopt a new system, and form each wire into a distinct cable by itself: thus between England and Holland there will be laid six independent submarine cables, each of them containing one wire. The advantage of this method in the case of any accident occuring to the insulation is great, as the faulty rope can be immediately recognised, and also overhauled and repaired with facility; which, with a heavier line, if possible at all, would certainly be an operation of considerable difficulty and time. These six cables will be laid down in succession one after the other during the ensuing spring. The last four or five miles on either side, being the portion most subjected to danger, will consist of a compound cable composed of six strands of the single wire cable twisted into one; the strength and weight of which,—twelve tons per mile,—will act as a safeguard against vessels inadvertently anchoring on the line, or any mischief that may be attempted.

The cables consist of a copper wire (No. 16.), which, after receiving two distinct coatings of gutta percha, is again covered with broad linen tape, coiled round it by a machine constructed for the purpose; it is then well tarred and passed through sand; this makes a very strong and impervious protection to the gutta percha. The wire thus prepared, when dry, is further enveloped to the thickness of one-eighth of an inch in a coating of tarred yarn; and the whole is finally covered with ten galvanised iron wires, each about one-eighth of an inch in diameter, twisted round it in the usual manner.

The entire length of *sea* ground to be crossed is 107 miles; but each cable will be made about 130 miles long, to guard against accidents, and allow for loss in paying out. Two of the ropes are already completed, and are only waiting until the return of fine weather will permit the engineer to complete his difficult task of finally committing them to the deep. The points selected as the most favourable for the undertaking, are Lowestoft, on the coast of Suffolk, and Scheveningen, a fishing village in Holland, four miles distant from the Hague.

When this undertaking of truly national importance shall be completed, it is intended to return to this subject, and at an early period to give a detailed account of the operations.

## HOME CORRESPONDENCE.

### TO THE COUNCIL OF THE SOCIETY OF ARTS, ADELPHI, LONDON.

GENTLEMEN,—On the suggestion of your Secretary, I have prepared some observations upon the laws affecting Scientific and Literary Societies, which together with some suggestions for their improvement I now submit to your consideration.

The laws to which I refer, are the *Exemption Act*, of 1843; the Statutes of 39 Geo. III., c. 79; 57 Geo. III., c. 19; and 9 and 10 Vic. c. 33, in reference to *Corresponding Societies, and the Licensing of Lecture-Rooms*, and the *Public Libraries Act*, of 1850.

The object of the Statute of 1843 (6 and 7 Vic. c. 36), is fully stated in its title, namely, "An Act to exempt from County, Borough, Parochial, and other Rates, Land and Buildings occupied by Scientific and Literary Societies."

Much litigation has arisen upon this Act, which has to some extent narrowed its intended operation, and has suggested the necessity of amendment.

To those who are acquainted with the private history of the Act, no surprise is occasioned by the fact that some amendment is required. The framers of the Bill had no experience to guide them, there not having been any previous legislation on the subject; and it was so strongly urged by many members of Parliament as an objection to the measure, that more buildings than were intended would come within its operation, that additions which have since proved the source of much difficulty were made from time to time to the Bill during its preparation and passage through the House of Commons; and these were the more readily assented to from its promoters being wearied by a seven years' struggle against difficulties, and they were too thankful to get relief for their Institutions on any terms; and thus, like some other Acts, it contained many seeds of litigation, and became a puzzle to the Courts.

But notwithstanding the inconvenience and expense occasioned to some Institutions by litigation, it must be borne in mind that a considerable number of Institutions have been benefited. By returns made to the House it appears, that in 1844, as many as 200 Scientific and Literary Institutions were then enjoying immunity from rates and taxes; and in 1849, in addition to the foregoing, 129 other Institutions were also in possession of this boon by virtue of the Act, exclusive of those who, from alterations in their laws, obtained a second certificate from the certifying barrister, and out of the number of certificates granted to these 329 Institutions, not more than ten have been the subject of litigation in the Superior Courts.

I will now proceed to state shortly, and so far only as may be necessary to render intelligible what I propose by way of amendment, the conditions of exemption under the Act of 1843. In order to entitle a Society to exemption, it must be instituted for purposes of Science, Literature, or the Fine Arts exclusively, supported wholly or in part, by annual voluntary contributions; must not make, nor be capable of making, any pecuniary dividend amongst its members; and must procure a certificate of the officer appointed under the Friendly Societies Act, and the buildings in question must be occupied by the Society for the transaction of its business. Each Society desiring exemption has to send three copies of its Rules to the Friendly Society Barrister for examination, and he is to examine them in order to ascertain if the constitution of the Society be in accordance with the conditions of the Act before stated; if it be, he grants a certificate on two of the copies of rules, and he returns one to the Secretary, and one to the Clerk of the Peace, retaining the third copy. If the Society shall not appear to come within the conditions laid down by the Act, it is his duty to refuse his certificate. For this service each Society has to pay him a guinea.

Provision is made for the examination and registry of new rules, which it is not necessary here more particularly to refer to.

If the certificate be refused, the Society is empowered to appeal to the Quarter Sessions against the decision of the barrister.

And power is given to the ratepayers of the place where any exempted Institution building may be to appeal to the Quarter Sessions against such exemption, within four months after any rate from which it shall be exempted.

Such is the nature of the provisions of the Act.

The chief inconveniences which have been experienced under this Act are as follows:—The want of a more definite description of the Societies to be exempted, and of *security* to a Society of its title to exemption, after the decision of a court in its favour: for by a recent decision its title is liable to be questioned after every new rate, notwithstanding it may have had repeated decisions of the Queen's Bench in its favour. Again: the modes of procedure are unnecessarily vexatious and costly; for not only is a Society liable to have its title tried at the Quarter Sessions, according to the provisions of the Act, but also before the Queen's Bench; and, as before stated, these trials may be repeated *ad infinitum*.

In order to remedy these, and other inconveniences, a new Act is necessary; and Lord Denman, in the case of Queen *v.* Pocock, expressed a hope that some amendment would be made. This subject was much considered in the year 1849, and a Bill for the purpose was prepared by the promoters of the original Bill and others, which received the sanction of all the principal Provincial Societies and some important Societies in London. Its general features had also the sanction of the late Sir Robert Peel, and of Lord John Russell, and Sir George Grey. Difficulties, however, arose, when it was submitted to the Attorney-General, which delayed the matter too late for that Session, and discouraged the parties from renewing their efforts afterwards.

In this Bill we proposed not to establish any fresh exemptions; but—

1. To simplify the means for the ascertainment of the title to exemption.
2. To lessen the cost of determining that title.
3. To render the application of the law equitable, uniform, and certain.

The mode proposed for the accomplishment of these objects will be seen by the printed "heads of proposed Bill," accompanying this letter.

It may be convenient to notice here the chief alterations this Bill would make in the existing law. Our definition was—"Institutions carried on for the express, immediate, and exclusive purpose of promoting moral or intellectual improvement, the annual income of such Institutions being to the extent of two-thirds at least, derived from periodical or occasional contributions, and yielding no return in money to any of the contributors." We proposed to remove the duty of examining the claims of Societies from the Friendly-Society Officer, whose other duties have nothing in common with the duties under this Act, and to place them in the hands of an officer, to be specially appointed for this purpose. This is very important; for by the careful examination of claims, in the first instance, much litigation might be avoided.

It is provided by our Bill that public notice shall be given of every certificate, and that if no appeal be made in four months, or being made the certificate shall be confirmed, the title of the Society shall be indisputable until the certificate shall be withdrawn.

Moreover we propose, in order to check any fraud by alteration of rules, &c., to have an annual return from each Society, in the form prescribed by the Act, made to the Certifying Officer; and power is given to him to recall his certificate at any time, if by such return any Society shall appear to have forfeited its title, subject to appeal. This is essential to the carrying out of certain provisions of the Act, and it would be the means of collecting some most interesting and useful statistics relating to the Societies in question, and would tend to strengthen the union now happily existing amongst so many of them.

The occupation of any rooms by any curator or servant, as a residence, is not to prejudice the Society's title to exemption; but such rooms are to be rated as distinct tenements.

The occasional letting of lecture-theatres is declared not to disqualify Societies from enjoying the benefit of the the Act, the money so received being directed to be carried into the annual return, under the head of *Endowment*, as distinguished from periodical contributions.

The officer we propose to pay by fees of 21*s*. for first application for certificate, and 10*s*. 6*d*. with each annual return.

This Bill, I believe, would be found to work well, and would remove all the inconveniences which have attended the Act of 1843.

It may be convenient here to notice a complaint often made by Scientific Societies, that they do not enjoy any legal recognition. It is very possible that I do not understand what is desired, or what inconveniences have suggested the complaint. If it be that they desire to possess the powers of more conveniently suing in courts of law persons from whom they have suffered injury, I would observe that those persons would in most cases be members of the Society injured, and it would be much wiser for Societies to exclude the offending member than to go to law. I do not see why the inconveniences which may have suggested the complaint, should not be provided for by the Rules of each Society.

These Societies are partnerships; and as regards their properties, are regulated by the laws affecting ordinary partnerships. If, however, it can be shown that these Societies really require other remedies than those now within their reach, the proposed Act would afford a good opportunity for acquiring them. The legal registry of such Societies there provided would facilitate greatly the obtaining increased powers, but a strong case must be made out to justify any such application, and Societies will do well to beware of too much legislation.

### AS TO CORRESPONDING SOCIETIES AND THE LICENSING OF LECTURE-ROOMS.

By 39 Geo. III., c. 79, every house in which lectures shall be delivered, or public debates held; or which shall be used as a place of meeting for reading books or newspapers, and to which the admission shall be for money or by ticket, is declared to be "*a disorderly house*," unless licensed annually by Justices of the Peace; and pecuniary penalties of 100*l*., and 20*l*., are imposed on all persons who lecture, debate, or attend by payment of money, in such houses, or who supply books or papers to be used there; and power is given to common informers to sue for such penalties.[*]

Powers are given to Justices of the Peace to demand admittance to houses used for any of the purposes before-mentioned (and if refused admittance, the house is declared a disorderly house); and also to suspend licences granted by them, if lectures, debates, or books shall be deemed of a seditious or immoral character.

Houses licensed "for the *sale of ale*,"—the Universities, Inns of Court, and Gresham College are exempted from the foregoing provisions.

The Statute also declares that every Society composed of different branches acting in any manner separately or distinct from each other, shall be deemed to be an unlawful combination, and every member of it, and every person having correspondence or communication with it shall be guilty of unlawful combination.

The 57 Geo. III., c. 19, sec. 25, enacts, "That every Society or Club that shall elect, appoint, nominate, or employ any Committee, Delegate or Delegates, Representative or Representatives, Missionary or Missionaries to meet, confer, or communicate with any other Society or Club," &c.; "or to induce or persuade any person or persons to become Members thereof, shall be deemed to be unlawful combinations;" "and every Member or correspondent of any such Society is to be deemed guilty of unlawful combination."

It will, perhaps, be scarcely credited by some, that these Statutes are now extant, and form part of the law of the land; but it is too true that they are now in full force.

That such is the case, will be obvious by the Statute to which I shall have occasion next to refer. Others will probably say that they do not apply to any other than *political* Societies, and that the titles of the Acts show this. It is true that these titles mention only "Seditious" and "Treasonable" Societies; but that the Acts have unfortunately a much wider operation is proved by some of the clauses to be found in the Acts themselves; for there are clauses declaring that these Acts shall not extend to "any Meeting or Society of the people commonly called Quakers, or to any Meeting or Society formed or assembled for the purposes of a Religious or charitable nature only, and in which no other matter or business whatsoever shall be treated of or discussed;" (Sections 26 and 27 of 57 Geo. III., c. 19). These exceptions would not have been necessary, if only the Societies described in the title had been included.

These statutes were passed in the troublous years of 1799 and 1817; when those times passed away, and it became unnecessary to call their great powers into exercise, the Acts were forgotten; or if thought of, were deemed as having had, as some parts of them in truth had, only a temporary existence. From this happy ignorance the public was aroused by the following case:

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[*] 36 Geo. III. c. 8, contained similar provisions, but they were limited to three years.

On the 14th of September, 1844, a Lecture was delivered in Hull, on Christian Missions, which gave great offence, and an information was laid against one Richard Johnson, for acting as money-taker at the door of the lecture-room; and he was convicted by the magistrates in the penalty of 20*l.*, under 39 Geo. III., cap. 79: and this conviction was confirmed by the Queen's Bench.* Upon this (namely, in 1846) a Bill was introduced into the Commons by Mr. Duncombe, Sir D. Lacy Evans, and Mr. Aglionby, setting forth the clause under which Johnson was convicted, and also the other clauses to which I have referred; and then declaring them to be repealed. A clause was added, that no penalty of the Acts referred to (for they created many other offences and penalties) should be sued for by any common informer; thus in effect giving to the Attorney or Solicitor General in England, and Her Majesty's Advocate for Scotland, the sole power of proceeding to enforce the unrepealed penalties of the Acts.

Unfortunately this Bill was not passed, the Attorney-General considering it more prudent to retain the powers. I prepared a clause which I thought was very unobjectionable, to the effect that the Acts should not extend to societies which should pass through the ordeal of the Exemption Act of 1843: but this found no favour with the Attorney-General; he struck out of the Bill all the clauses, save that limiting the power of suing for penalties, to the Law-officers of the Crown, and all that was permitted to remain now forms the Statute of 9 and 10 Vict. c. 33, which is called, "An Act to amend the Laws relating to Corresponding Societies, and the Licensing of Lecture-rooms."

This Act, be it observed, does not relieve our societies from the penalties and opprobrium of illegality created by the "treasonable" Acts, but simply removes the instrument for our punishment from the hands of the common informer, and leaves it in the sole care of the Law-officers of the Crown. I am quite aware that this was a great improvement, and that there is no real danger to be apprehended; but shall it be said that the British Association, our learned societies, and other important educational institutions, shall be stigmatised as "unlawful combinations," and their halls and places of assembly be branded as "disorderly houses?" and yet so long as these statutes remain extant, what society is there that does not come within their denunciations and penal clauses?

I do not believe that any Government would refuse their sanction to the repeal of these statutes in respect to scientific and literary societies. This might be easily accomplished by a clause added to the Bill before recommended, declaring that every society which should possess a certificate of the Certifying Barrister, should be exempted from the operation of the statutes in question; but a better thing would be a total repeal of the clauses referred to.

*The Public Libraries Act*, 1850, requires amendment in several important particulars. It is too confined in its objects, and the machinery for effecting these is bad. We are greatly indebted to Mr. Ewart and his friends for this important advance upon former legislation; and it was, I am aware, the best Act they could induce the House of Commons then to sanction. But although not three years have elapsed since the date of this Act, public opinion on all matters connected with the diffusion of education has since that time made so great a stride, that Parliament would probably now be willing to extend the powers then rather grudgingly bestowed.

The powers of the Act are not co-extensive with its title; if they were, I should have but little to suggest. The title is, "An Act for enabling Town Councils to establish *Public Libraries* and *Museums*." The power which it gives to Town Councils is to acquire *buildings* for public libraries and museums; not one farthing can they expend in the purchase of those things without which those buildings would be useless. The only things on which they are enabled to expend money, are, "fuel, lighting, fixtures, furniture, and other similar matters."

The amendment I have to suggest on this point is, that Town Councils should be empowered to purchase books, maps, and the productions of art and science, and also to provide lecture-rooms, reading-rooms, and laboratories; and to allow the use of these rooms or laboratories to such societies as should possess a certificate from the Certifying-officer of Scientific Societies; provided also, that such societies should admit gratuitously to their lectures and classes a certain number of persons to be nominated by the Council; and I would require the Council to select as their nominees operatives who should have distinguished themselves by their progress in scientific knowledge in some or other of the educational institutions in the town, the judges of such progress being examiners so appointed as to ensure competent men for the office.

I think Town Councils should have the power of granting an annual educational rate, for the purpose of providing instruction in practical science and natural philosophy, so as to facilitate the education of the operative classes in large towns in the principles connected with their various occupations. This may perhaps be considered too great a subject to be taken up now. The difficulties which would attend it, and which might alarm some, I am sure might be surmounted, if the object should be really desired by any considerable number of earnest men.

I will now proceed to the machinery which the Library Act provides for its limited object. The Town Council must first move the Mayor, and then he may invite the burgesses, to send in voting papers, saying "aye," or "no," to the question, "shall the Act be adopted?" If two-thirds of the burgesses who send answers to this invitation say "aye," the Council may levy an annual rate of one halfpenny in the pound for the acquisition of buildings, and finding fuel, &c.; but if the votes for the Act should fall short of this number of two-thirds, then not only is the Council unable on that occasion to proceed under the Act, but the question cannot be mooted again in that borough for two years.

I contend that this mode of voting, and the proportionate number of votes required, are wrong in principle and inconvenient in practice. I would give the Council the power without any voting by the burgesses; but if this cannot be accomplished, the voting should be preceded by an assembly of the burgesses in public meeting; without this, the voters have not the means of understanding the matter in issue and are very much at the mercy of unscrupulous people, to be found in every borough, who for the sake of the popularity so easily gained when *economy* is the cry, do not hesitate to retard most desirable improvements. Again, I would make the majority, instead of two-thirds of the votes taken, decisive; I know no good reason for departing from the principle sanctioned in the highest assembly in the kingdom upon the most momentous questions.

To conclude; I would respectfully yet earnestly urge upon the attention of your influential Society, the importance of obtaining two Acts of Parliament; one which should substitute for the Exemption Act of 1843, the provisions sketched in the "Heads" accompanying this Letter, with the addition of a clause repealing the Statutes of 39 and 57 Geo. III., so far as our Societies are concerned: the other, substituting for the Public Libraries Act, enactments giving extended powers to Town Councils to found public Libraries, Museums, Lecture-Rooms, and Laboratories; and, if practicable, to provide instruction in practical Science and Natural Philosophy, for the industrial classes.

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* The Queen v. Johnson, 82 B. Reports, p. 162.

These Acts would of course be *Public* Acts, and consequently the application for them would not occasion any expense beyond such as would be incurred in printing, stationery, &c.

If I should be so happy as to induce your Society to take into your consideration the subjects on which I have ventured to address you, and not without a painful consciousness of my inability to do justice to them, I doubt not you will devise some provisions much better calculated for the ends in view than those I have submitted; and I am sure you will succeed in accomplishing whatever you may determine upon as desirable.

I am, Gentlemen,
Your obedient Servant,
BIRMINGHAM, ARTHUR RYLAND.
*24th January*, 1853.

## IMPROVEMENTS IN FIRE-ARMS.

SIR,—It was with much regret that I was obliged to leave the meeting on Wednesday last, before the discussion on Mr. Wilkinson's paper on fire-arms was terminated. It is desirable that one or two points should be mentioned on the subject, both as regards the information and the practice contained in them. The very serious expense of making hasty changes, more particularly before the value of such change is thoroughly established, is not to be forgotten among the causes of delay in adopting improvements. The change from the old flint musket was happily hastened by selling a large number (50,000 stand, it was said) of the old pattern to the Spanish Government for their civil wars; while the final clearance was effected at the burning of the Tower. The former lot may be seen to this day, not only in Spain, but scattered over South America. It is not every government that will buy a bad article; and the Tower is not so accommodating on ordinary occasions. If such a blessing could occur to the stores at Woolwich, the service would be benefited, for we hardly expect the economical idea of burning the useless stores *outside* the buildings to be adopted. Delays in improvement cannot be charged on Government alone. In the year 1843, I asked one of the most eminent rifle-makers (I will not mention names), to make me a double rifle, two-grooved, of 2 feet 2 inches barrel, with "a quarter of a turn;" *i.e.*, one in about 9 feet. He strongly remonstrated; but this is about the amount now strongly recommended by Mr. Wilkinson.

The main cause of the bad shooting is not chargeable on the weapon. Nelson was killed with a smooth bore especially aimed at him. It is the confusion, the smoke, and inability to see the object; to say nothing of the peculiar whiz of a bullet close to your own ear. The case of the Kaffir war proves nothing. I know an occasion when 22,000 rounds were fired and one man killed. What then? the question is, how many were *aimed at* any thing, or person. Not more than three Kaffirs were seen. This may be a waste of ammunition, but not a single shot was *aimed*, and this was not the fault of the weapon. But there is another cause of bad shooting, and this is a matter deserving of consideration with amateur riflemen. In the army it is sadly neglected. A light infantry soldier or rifleman has frequently to change his position very rapidly and to run very fast from point to point; and to fire steadily after such exertion requires amazing practice. The "Chasseurs de Vincennes," are regularly trained to run and fire. They have to practice running a mile, sometimes alone, sometimes alongside a horse soldier and holding his stirrup. About twenty in every 100 can stand the necessary training, the rest are drafted to the line. We have nothing that can compete with them.

Lastly, it should be known that the improvement suggested by Mr. Wilkinson is already attained *more perfectly* by our "rifle musket," where the conical ball, with the hollow end made thinner, is used *without the cup*, and succeeds perfectly. The opinion at Woolwich is by no means generally in favour of Mr. Wilkinson's improvement. Yours, &c.,
F. E. W.

## COMMUNICATION BETWEEN THE GUARD AND ENGINE-DRIVER.

DEAR SIR,—In addition to the simple contrivance of Mr. Whishaw's, in the last Journal, p. 127, if you would suggest to all Railway Companies that which I adopted upon the Eastern Counties Railway, and have urged upon the Directors of many others, namely, fixing a small looking-glass immediately in front of the engine-driver, he would be able to see all that was passing behind him.

At night I used coloured lights, *white*, *green*, and *red*, when necessary for the guards to communicate with the engine-driver.

JOHN BRAITHWAITE.

# PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ROYAL SCOTTISH SOCIETY OF ARTS.—The Society met in their Hall, 51, George-street, on Monday, 24th Jan., 1853, at eight o'clock, P.M., Robert Ritchie, Esq., Assoc. Inst., C.E., Vice-President, in the chair. The following communications were made:—"On the adaptation to every day practice of the Capillary Tube method of preserving Vaccine Lymph," by William Husband, M.D. and A.M., Edinburgh. The author exhibited the tubes, and described the manner of using them, pointing out that the peculiarity of the method, as modified by him, consisted in its perfect simplicity, and in the extreme facility with which the manipulations connected with it were performed. He stated that in these respects his tubes differed essentially from every other form of tube hitherto described; and referred, in confirmation of this assertion, to the accounts given of the capillary tube method by the highest English and French authorities up to the present day. The author recommended his tubes, not as supplementary to the common methods —such as the square pieces of glass—but as a substitute for them. He contended that these methods ought to be abandoned, and the tube method, as modified, adopted in their stead, on account of its extreme simplicity and manageableness, and because it furnished a really efficient means of preserving vaccine lymph for future use. He stated that he anticipated ere long the universal adoption of the method in question by the medical profession, both in civil and military practice, and the consequent entire cessation of the present system of borrowing and lending lymph, with all its attendant annoyances and evils; and that he was prepared to demonstrate that the necessary result will be a great mitigation of the ravages of small-pox, and a great saving of human life. "Description of a Stop-Cock, with India-rubber Tube and improved action." The next paper read was by Mr. J. Robb. In this invention, the outer case is of cast iron; and by the use of vulcanised India-rubber tubing, leakage is prevented. The last paper read was a "Description of an Elastic Self-adjusting Castor, applicable to Furniture, Musical Instruments," &c., by Mr. J. Robb.

**Royal Institution**, Albemarle-street, Feb. 7.—A General Meeting of the Members was held this day, W. Pole, Esq., F.R.S., Treasurer, in the chair; when Thos. W. Allies, Esq.; J. Bell Brooking, Esq.; John Foster, Esq., F.L.S.; John Henderson, Esq.; and Thomson Hankey, Esq., were elected members. Thanks were voted to Professors Faraday and Williamson, and to the Astronomer Royal for their discourses on January 21st and 28th, and February 4th, abstracts of which will shortly be issued to the members.

## PROCEEDINGS OF INSTITUTIONS.

**Carlisle.**—On Tuesday, the 1st inst., the Rev. D. B. Lonson, M.A., delivered an interesting Lecture to the members of the Mechanics' Institute, "On the Geology of Carlisle and of the Great Plain of Cumberland." The lecturer traced the boundary line of that great plain, commencing at the mouth of the Nith, returning along the bases of the northern and eastern hills, as far south as Brough and Kirkby Stephen; from thence coming northward again to Penrith, and curving round the foot of the Caldbeck and Brocklebank Fells to Maryport. He referred to the unaltered state of the surface of the plain during all the historical period, and from old Norman and Danish names of places, from Roman works and Celtic monuments. Stripping off the thin green rind of soil, he showed the great floor of new red sandstone rocks lying below, accurately coinciding with the boundaries already described, and in truth constituting the plain. Explaining the nature of this rock as having been a deposit from water, he then showed that the plain of Cumberland was the bottom of an ancient sea, or, more properly, of an ancient frith—an arm of a great ocean, which at that time covered the greater part of England. He then gave some account of the general appearance of sea and land, and, from fossil remains and fossil footmarks, described the plants which grew upon its shores, and the animals which inhabited its depths. He stated the relation of the new red sandstone formation to other geological formations, and concluded by showing that all these were but a small part of a still greater history of the plain of Cumberland, written in other and deeper formations that lay below it.

**Crieff, Perthshire.**—The annual soirée of the Crieff Mechanics' Institution took place on Thursday evening, January 27th, in the Freemasons' Hall. The chair was occupied by Dr. Gardner, President of the Institution. The following addresses were delivered after the opening address of the President, namely, "The Influence of Mechanics' Institutions," by Rev. J. Cunningham; "On Savings Banks," by Rev. J. Martin; "On Life Assurance," by Dr. Fairless; "On the Education of Youth," by Rev. F. M'Alister; "On the Benefits of Reading," by Mr. William Thomson; "On the Progress of Knowledge in the Nineteenth Century," by Rev. William Ramsay; "On the Economising of Time," by Rev. John R. Omond. During the evening, Mr. R. Smith (formerly of the Polytechnic Institution, London), explained and exhibited the working of his own, and other electro-chemical printing telegraphs, and also his powerful electro-magnet, which was exhibited for some time in the Polytechnic Institution, and there supported a weight of three tons. The proceedings were further enlivened by the services of Mr. T. M. Hunter, vocalist, who sang a variety of his favourite songs, with accompaniments on the pianoforte, and a couple of songs, composed for the occasion, were sung by the author, Mr. P. Allan, and copies of the same distributed amongst the audience. The Institution is progressing favourably, the number of members has doubled this last year, the library has received a large increase of books, and popular lectures are delivered every second week to the members and the public at large.

**Holmfirth.**—On Wednesday evening, the annual soirée of the Mechanics' Institution took place, when Mr. Cobden, M.P., for the first time addressed the inhabitants of Holmfirth. About 600 persons took tea together in the Wesleyan school-room, and afterwards adjourned to the Town Hall, where the speeches were delivered. The assembly included all the leading inhabitants of the neighbourhood.

**Oldham.**—On Monday evening the annual meeting of the members of the Lyceum took place in the court-room of the Town Hall, Mr. James Platt, the President of the Institution, in the chair. The first business was the election of the following gentlemen as directors for the ensuing year:—Messrs. W. Bodden, S. Buckley, B. Clegg, R. Cooper, T. Emmott, H. Gregson, T. Hanson, W. Hoyle, W. Ingham, F. Jackson, T. Jackson, W. Knott, J. Lees, J. Lees, G. J. Murray, N. Marsden, J. Newton, R. Ogden, S. Riley, H. T. Robberds, A. Stott, J. Taylor, W. Tweedale, J. West.—The Annual Report was read by Mr. Taylor, the Secretary, and Mr. Buckley read the financial statement, which showed a balance of 30*l.* in the hands of the Treasurer, which it was determined should be spent in purchasing books for the library. The President said that he felt great pleasure in congratulating the members of the Institution on the position of their finances; but they all felt that, however gratifying such a fact might be, there was something more requisite, and that the time had now arrived when an effort must be made in behalf of a new Lyceum. Most of them were probably aware that it was proposed shortly to have a great gathering of the friends of education, for the purpose of raising subscriptions to erect a new building; and in order to give the matter a practical turn, and to induce others to support them liberally, he promised to give 100 guineas, provided that a sum of not less than from 1,000*l.* to 1,500*l.* was raised from other sources.

**Royston.**—The members of the Mechanics' Institute held their General Annual Meeting on Monday evening, 31st January; John Fordham, Esq., in the chair. The Secretary, Mr. John Warren, read the report, from which it appears that the number of members and subscribers was 213, being thirty more than the in year 1851. The income derived from the subscriptions of these members and subscribers was 42*l.* 6*s.*, exceeding that of the previous year by the sum of 4*l.* 11*s.* The sale of non-subscribers' lecture tickets amounted to 30*l.*; in 1851 a similar sale produced only 14*l.* 14*s.* 6*d.* The total income of the year (not including the balance from the previous year), amounted to 96*l.* 3*s.* 3*d.*; that of 1851 amounted to 84*l.* 14*s.* 10*d.* The Committee of Management for the year 1853 was then elected; and after having voted thanks to the Chairman and Secretary, the meeting broke up.

**Southampton.**—The annual soirée of the Polytechnic Institution took place on Tuesday week, on which occasion the Victoria Rooms were crowded with a highly respectable audience, who enjoyed themselves right heartily throughout the evening. The chair was taken by the Mayor of Southampton, J. Lankester, Esq. His worship opened the proceedings in a brief but appropriate address, in which he observed that he deemed it to be his duty as chief magistrate to assist in every movement which might aid the commercial, social, religious, or political advancement of the town. Addresses on appropriate sentiments were afterwards delivered by Messrs. H. Norrington, T. Falvey, J. C. Cox, W. Weston, and Alderman Andrews; and Mr. W. Wakeford, one of the Secretaries, gave a few particulars relative to the present state of the Institution, which is in a very flourishing condition. On Wednesday evening a lecture was given by Mr. D. Mackintosh, on "The Nebular Discoveries of Sir John Herschel and Lord Rosse."

**Sudbury.**—On Friday evening, the 21st ult., Mr. Rouse delivered a very interesting lecture "On Astronomy" to the members of the Literary Institution. The lecturer, although a working man, appeared fully to understand the subject, which was well illustrated by diagrams, and was listened to with much attention by a numerous audience.

**Yarmouth.**—The Committee of the Yarmouth and Southtown Institute have published their Annual Report, by which it would appear that the past year formed an important epoch in the history of this Institute, and that it was with no common feelings of pleasure and satisfaction they were enabled to address the members in terms of sincere and hearty congratulation. The Society has been in existence eight years, and it was believed that at no former period had it displayed such healthy and vigorous action, nor given greater promise of a long and extended career of usefulness. There had been a large accession of new members, and the total number of subscribers had been much greater than during any previous year.

## MISCELLANEA.

**School of Design.**—It is stated that the necessity of at once completing the new buildings at Somerset House now erecting for the Inland Revenue Offices, and of consolidating the public offices on that site, has induced the Government to determine on the immediate removal of the School of Design from Somerset House. The opportunity, it is said, will now be seized of effecting a public improvement, which will greatly increase the usefulness of the School. Instead of having but one Central School of Art for the whole of the Metropolis, arrangements in concert with local authorities will be made, to carry out the wishes often expressed, of establishing district Schools in several parts of London. The improvement will not stop here, as facilities will thus be created of teaching Elementary Drawing in any parochial schools which may desire to have it. The few students in the higher stages of instruction at Somerset House will be removed to Marlborough House, where they will be enabled to participate more largely than at present in the means of education afforded by the Museum, Library, and other features of the Department of Practical Art.

**Straw Paper.**—This manufacture was first introduced about fifty years ago, but was only partially successful. By an interesting and important improvement in the mode of preparation, the use of straw as a material for paper may now be considered permanently established in England, Ireland, and the United States. So little difference is perceptible between rag and straw paper, that the latter is used by one of the London journals regularly. One peculiar feature of the manufacture is, that although the article can be produced at a price not exceeding that of ordinary printing paper, it is applicable for both writing and printing purposes.

**Village Libraries.**—An itinerating village library, formed in accordance with the suggestion thrown out at the last meeting of the Yorkshire Union of Mechanics' Institutions, has recently been established under the munificent patronage of the Earl of Carlisle, in Slingsby, Coneysthorpe, Bulmer, Wilburn, and Coxwold,—some of the neighbouring villages have also expressed a desire to join in supporting it. A lending and reading library has also just been formed in Windsor Great Park, under the sanction and patronage of the Prince Albert, who has permitted the appropriation of his rooms in Cumberland Lodge for the purpose. The subscription is fixed at Two Shillings per annum.

**Museum of Ornamental Art at Marlborough House.**—The numbers attending during the month of January were as follows; 11,751 persons on the public days admitted free; 624 persons on the students' days, and admitted as students, on the payment of 6*d.* each, besides the registered students of the classes and schools.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

A neat Case, for holding the Numbers of the Journal for half a year, is now ready, and may be had of the Publisher, 186, Fleet-street, price 1s. 3d.

### QUESTION FROM CORRESPONDENT.

*Varnish.*—Can any correspondent inform me how to prevent mastic varnish from *chilling* by exposure to the atmosphere? I find that the chill is apt to return to the surface of the varnish again and again after having been removed. [No. 34.]

### ANSWERS TO CORRESPONDENTS.

*Brewing.*—I believe the experiment suggested by your correspondent (No. 31), was tried some years since at Messrs. Truman's brewery, the steam of the beer being carefully condensed: if I remember rightly, it was a decided failure, the condensed water having hardly any flavour.

*Brewing, No.* 31.—Your correspondent may probably obtain some information on an analogous subject by tracing the Patent Registers of the year 1831, as I believe in that year Mr. Hicks, of Wimpole-street, patented an invention for condensing the alcoholic vapours arising from the *baking of bread*, with what success I am not able to say.

*Book Indexing.*—I must differ from the answer to question 28, given at page 131, in which your correspondent says that letterpress printing has been attempted upon the edges of volumes, but without success. I have several foreign books very well lettered in this manner, and I find them very convenient for reference; the edge of each section of the volume is stained of a slightly different colour, and the title very clearly printed on it in legible letters.

## PATENT LAW AMENDMENT ACT, 1853.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 4th Feb.*, 1853.

*Dated 12th Jan.*, 1853.

88. F. and A. Laurence—Improvements in sluices and lock-gates.

*Dated 15th Jan.*

104. W. Bailey—Construction of railway signals, &c.

*Dated 18th Jan.*

122. F. G. Underhay—Machinery for mowing.

*Dated 19th Jan.*

129. W. Vincent—Improvements in cocksor taps.
131. J. R. Cooper—Improvements in fire-arms.
133. W. E. Newton—Improvements in lamps. (A communication.)
135. C. Malo—Improvements in steam generators.

*Dated 20th Jan.*

137. J. Crabtree—Machinery for winding and doubling yarns.
138. P. R. Jackson—Hoops and tyres for railway-wheels, &c.
139. J. W. Ward—Manufacture of textile fabrics.
140. C. Ward—New construction of bassoon.
141. C. Ward—"A cymbal drum."
142. R. M. Deeley—Grates of furnaces in glass manufacture.
143. H. de Manara—Arrangements for preventing sea-sickness.
144. W. Riddle—Ornamenting walls and surfaces.
146. A. T. J. Bullock—Improvements in taps and cocks.
147. W. Williams—Refrigerating apparatus.

*Dated 21st Jan.*

148. G. Carter—Construction of furnaces.
149. E. Edwards—Knobs and handles of glass for doors, &c.
150. Capt. J. Addison—Communication between guard and driver by means of a lamp-signal, &c.
151. A. A. Meijsenheijm Knipsehaar—Illuminated night-clock.
152. G. Thornton—Propelling vessels.
153. J. Middlemass—Application of a new material for portable houses and other buildings.
155. W. Taylor—Production and application of heated air.
156. Rev. M. Andrew—Fastenings for windows.
157. A. Prince—Articles of furniture from produce of plants of the cactus tribe, and preparing the same. (A communication.)
158. W. J. Curtis—Excavating, or digging-machine, &c.
159. R. Plant—Construction of glasshouse furnaces.
160. J. Chubb and J. Coater—Locks and latches.

*Dated 22nd Jan.*

161. L. J. J. Malegue—Composition for dyeing.
162. B. Quinton—Fastening for brooches, &c.
163. J. P. M. Myers—Artificial fuel.
164. W. Sharples—Apparatus for marking at billiards and other games.
165. W. D. Stevens—Signalizing between one part and another of railway trains.
166. G. Fife, M.D.—Safety-lamps, &c.
167. J. Medworth and L. Lee—Lithographic presses.
168. J. Paul—Machinery for making drains.
169. P. H. Desvignes and F. Xavier—Galvanic batteries.
170. A. W. Callen—Modes of giving and transmitting multiplying rotative motion to shafts, &c.

*Dated 24th Jan.*

171. H. Brinsmead—Reaping-machine.
172. H. A. Holden, E. Bull, and A. Knight—Communication between guard and driver.
173. B. Perreyon—Fastening buttons, improved button and machinery for same.
174. D. C. Knab—Process of and apparatus for distilling, &c.
175. D. Beatson—Propelling ships.
176. W. Nairne—Dressing yarns.
177. C. Randolph and J. Elder—Propelling vessels.
178. W. Kendall—Manufacture of boxes, &c., and machinery for same.
179. J. H. Johnson—Aërial navigation and machinery for same. (A communication.)
180. J. Stevenson—Machinery for spinning flax and tow.
181. A. E. Brae—Signals from one part of railway train to another.

*Dated 25th Jan.*

186. F. Roe—Paving roads and streets.
188. J. Sangster—Umbrellas and parasols.
190. J. Wiggins—Cement for resisting moisture or damp.
192. H. H. Price—Raising and forcing water, &c.

*Dated 26th Jan.*

194. T. D. Davis—Improved valve for steam and gas-engines.
198. T. F. Cashin and J. Stirk—Grinding machine.
200. J. H. Johnson—Lubricating and apparatus for same.
202. W. H. Moore—Construction of temporary dwellings.

APPLICATIONS WITH COMPLETE SPECIFICATIONS FILED.

209. C. Noel—A new regulating bit. Jan. 28, 1853.
242. G. Twigg and A. L. Silvester—Cutting and affixing stamps and labels. Jan. 29, 1853.
250. W. Williams—Cutting and shearing iron and other metals. Jan. 31, 1853.
268. T. L. Clarkson—Manufacture of hats, caps, and bonnets, &c. Jan. 31, 1853.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 7th Feb.*, 1853.

116. William Bolivar Davis, of Southampton—Improvements in ships' buoys, life-buoys, ships' fenders, and other similar articles.
403. Jeremiah Driver, of Keighley, Yorkshire, and John Wells, of Bradford, Yorkshire—Improvements in mouldings in sand and loam for the casting of iron and other metals.
450. George Heyes, of Blackburn—Improvements in the manufacture of fancy woven or textile fabrics, and in the machinery or apparatus connected therewith.
519. Matthew Fitzpatrick, of Upper Cleveland-street, Fitzroy-square—Improvements in machinery or apparatus to be applied to locomotive engines and carriages for the prevention of accidents, and also in the manufacture and application of indestructible and non-rebounding cushions, to be applied to the above and other similar purposes.
684. Thomas Dunn, of Pendleton, and William Watts, jun., of Miles Platting, near Manchester—Improvements in the construction of railways.
933. James Rothwell, of Heywood, near Manchester—Improvements in looms for weaving.
971. Frederick Mackellar Gooch, of Bolton-le-Moors—Improvements in the construction of railway signals, and in machinery or apparatus for working railway signals.
1005. Emile Kopp, of Accrington, and Frederick Albert Gatty, of Accrington—Improvements in printing or dyeing textile fabrics.
1108. Juan Nepomuceno Adorno, of Golden-square—Improvements in the manufacture of cigars, cigarettes, and other similar articles.

*Sealed 9th Feb.*

355. Peter Warren, of Strathmore-terrace, Shadwell—Improved material applicable to many purposes for which papier maché and gutta percha have been or may be used.
476. Samuel Marsh, of Mansfield, Nottinghamshire—Improvements in the manufacture of woven fabrics, by means of lace machinery.
650. James Wotherspoon, of Glasgow—Improvements in the manufacture or production of confectionary, and in the machinery, apparatus, or means employed therein.
753. Robert Sandiford, of Tottington Lower End, near Bury—Improvements in apparatus for block-printing.
757. Thomas Taylor, of the Patent Saw Mills, Manchester—Apparatus for measuring water and other fluids, which apparatus is also applicable to the purpose of obtaining motive power.
788. William Williams, of Birmingham—Improvements in electric telegraphs.
798. Jean Joseph Jules Pierrard, of Paris—Improvements in preparing wool and other fibrous substances for combing.
826. Francis Bywater Frith, of Salford—Improvements in machinery or apparatus for dressing, machining, and finishing velvets, velveteens, cords, beaverteens, and other similar fabrics composed of cotton, silk, wool, and other fibrous materials.
850. William Henry Winchester, of Tamerton Foliott, near Plymouth—Improvements in splints.
903. William Pink, of Fareham—Improved construction of stirrup-bar for saddles.
935. James Edward M'Connell, of Wolverton—Improvements in locomotive engines.
1069. Richard Taylor, jun., of Queen-street, Cheapside, and John Arthur Phillips, of Upper Stamford-street—Improvements in treating zinc ores.
1070. Clement Dresser, of Basinghall-street—Improvements in combining materials to be used in substitution of whalebone and other flexible or elastic substances. (A communication.)
1087. George Sands Sidney, of the Willows, Brixton-road—Improvements in jugs or vessels for containing liquids.
1097. Joseph Matthews, of Strickland-gate, Kendal—Burglary alarm.
1100. William Robertson, of Barrhead, Renfrew—Improvements in certain machines for spinning and doubling cotton and other fibrous substances.
1115. William John Silver, of 47, Clark-street, Stepney—Improvements in giving motion to capstan and other barrels.
1116. George Gwynne, of Hyde-park-square, and George Fergusson Wilson, of Belmont, Vauxhall—Improvements in the manufacture of candles, night-lights, and soap.
1136. Thomas Greenshields, of Stoke-works, Worcester—Improvements in the manufacture of alkali.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Feb. 9 | 3419 | Improved Fish-tail Burner. | Henry and John Gardner | 453, Strand. |

# SOCIETY OF ARTS.

FRIDAY, FEBRUARY 18th, 1853.

## TENTH ORDINARY MEETING,

*Wednesday, February 16th*, 1853.

The Tenth Ordinary Meeting of the Society was held on Wednesday, the 16th instant, William Tooke, Esq., F.R.S., Vice-President, in the chair.

The following were elected Members:

Beldam, Valentine, Royston.
Bigg, Heather, 15, Weymouth-street, Portland-place.
Bridson, Henry, Bolton-le-Moors.
Fauntleroy, Robert Thos., Potters-fields, Tooley-st., Southwark.
Franklin, Frank, 4, Orsett-terrace, Westbourne-terrace North.
Gwilt, Alfred, 7, Union-street, Southwark.
Hornor, Edward, Halstead.
Hubbard, Rev. George, Corfe Castle, Dorset.
Jewitt, Lewellyn, Plymouth.
Michell, William, M.P., Bodmin.
Montizon, the Count de, 2, Cranley-place, Onslow-square.
Newton, Henry Charles, 46, Camden-road Villas.
Oakes, Henry Porteus, M.P., Bury St. Edmunds, and the Oxford and Cambridge Club.
Oldfield, D., 13, Bouverie-street, Fleet-street.
Snell, Edward, 14, City-road.
Tennent, Sir J. E., Bart., M.P., Board of Trade.
Thomas, John William, 153, New Bond-street.
Turner, Rev. J., M.A., Lancaster.
Uzielli, Matthew, Hanover-lodge, Regent's-park.
Wade, J. M., 45, Lincoln's-inn Fields.
Wills, William Henry, 12, Camden-square.
Window, Frederick Richard, 8, Craig's-court.

and the names of eight candidates for membership were read.

A paper was then read by Mr. J. Sparkes Hall on the History and Manufacture of Boots and Shoes.

Mr. Hall commenced with the antiquarian part of his subject, giving a brief, though connected sketch of the various sandals and shoes used by different nations, from the sandals of the ancient Egyptians down to the most highly-finished productions of the present time. He then described the more recent alterations which had been made in the art of shoemaking, and specially described those improvements which he had himself introduced.

He then entered at some length into the more *practical* part of the subject—the boots and shoes of the present day.

About twenty years since he first thought of an *elastic* boot, that might possibly remedy many of the evils complained of, and combine many advantages never possessed by any former boot. His first experiments were not wholly successful, as the manufacture of elastic materials was not then so perfect as it was at the present period, and the necessary elasticity could not be found in any material then made. The difficulty was to get an India-rubber web so elastic that the boot would go on and off freely, and yet not so soft and yielding as that it would not return again to its original form. After several experiments with wire and India-rubber, he had succeeded in getting the exact elasticity required; and subsequent improvements in materials and workmanship, together with the valuable assistance rendered by Mr. Thomas Hancock, the patentee of the vulcanized India-rubber, had combined to make the elastic boot the most perfect thing of its kind.

Shortly after the elastic boot was brought out, the author made some improvements in shoes, either wholly or partially elastic. They were well suited for persons whose feet swell, and whose insteps rise very suddenly, as they accommodated themselves to those changes.

The elastic India-rubber overshoes were another improvement. They were put on and taken off without any trouble of fastening; and by a very simple arrangement of a plush back, all chafing of the boot was avoided, and great firmness secured, without a chance of their "slopping."

Mr. Hall then pointed out some of the chief desiderata in the manufacture of boots and shoes, and to which he specially directed the attention of manufacturers.

It was a proverb, about twenty-five years ago, that "a clumsy boot was till lately a distinguishing mark of a true Englishman abroad."

This, however, could not now be maintained The French, since the war, had improved wonderfully; and although England had been slow to act, yet now at length our advance in this department of trade was most marked and signal. The improvements effected by the introduction of elastic fabrics, as side-springs, insteps, and waists, were becoming universal; although few persons knew the opposition made to them by elder brethren of the trade, who saw nothing like leather, and would have nothing but leather. The form, also, of our boots and shoes had been bad; and it might be shown that the faults of which Professor Camper, of Leyden, complained, when writing on this subject about 100 years back, were still adopted by many shoemakers, viz. —that of giving the pressure on the very parts of the feet which should have freedom and relief. That more mind had been manifested among the industrious fraternity of shoemakers than had been found amongst any other equally humble class of the community, was almost a truism; and it had been quaintly remarked, that Pope might have had an eye to the profession when he wrote—

> "Worth makes the man, and want of it the fellow;
> The rest is all but leather and prunella."

The improvements most to be desired in the manufacture of boots and shoes were, first, form, by which was not meant the adoption of one extreme of fashion, as from the twelfth to the sixteenth century,—but a suitable, graceful imitation of the human foot, derived from actual observation, or, where that could not be obtained from an outline on paper, or plaster cast, and lasts made with due consideration and care. Next, the upper leather should be chosen from the softest and best skins, of which numerous specimens of both foreign and British manufacture, received medals and honorary mention at the Great Exhibition. These should be cut up in the right way, and to the best advantage. In this department there was great room for improvement.

Improvements in binding should next be considered, and any ready mode of blocking, as well as of avoiding seams, where possible, and effecting further economy and durability, by improved patterns, could not fail to be duly appreciated.

Several improvements might yet be effected in making boots and shoes; and whether by the usual mode of sewing, the American plan of pegging, or the more recent *souliers a vis* and metallic stitches of the French, much remains to be done.

It might safely be said, encouragement should be given to any ingenious workman who might contribute, in these or any other respects, to the advance of his art. It appeared, also, desirable, that the number of emigrants now leaving our shores should be supplied with boots and shoes adapted to the climate, country, and occupation they intended to adopt; and to that end, premiums might be safely awarded for the best boots and shoes of the kind most advantageous in their pursuits. It was distressing to see the cases and trunks of ill-made boots and shoes shipped daily for Australia, India, and the Cape, which must eventually lead to vexation and disappointment when worn, being frequently made without reference to utility or comfort, only "to sell," and were seldom worth the carriage. The poor emigrant also was deceived by the attractive handbook issued by quacks, and thought that, as the verses please him, the boots would do the same. "Good shoes," observes Dr. Aikin, "are one of the most necessary articles of dress, for health and comfort to those who go much abroad; nor has human industry in many cases more happily exerted itself than in discovering the most perfect mode of answering the purposes required in this manufacture."

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Mr. **Winkworth** observed that there were two points to which, although very ingeniously propounded by Mr. Hall, he could not entirely subscribe. In the first place, in reference to elastic shoes and boots, whilst he did not deny that, in certain circumstances, great advantage might be derived from the support they afforded, yet he could not but think—and he was confirmed in his views by the customs of all enlightened nations—that there was a still more important advantage obtained, under general circumstances, from the feet being kept as free as possible. He believed, too, that the feet, as well as the other parts of the body, were not intended to be kept entirely out of sight. Every one entertained the idea that the ankle of man and woman was characterised by the line of beauty; which was, he thought, almost entirely covered over by these elastic boots. The next point was in reference to India-rubber over-shoes, and the remarks, in which Mr. Hall had implied that good ones were made only in this country. He had, himself, for about a year and a half, worn almost constantly a pair of American India-rubber over-shoes, which had been presented to him by Mr. Swift, M.P., for Sligo (late Sheriff of London), who was a very large importer of India-rubber shoes and boots from America. He had worn them a great deal, both whilst travelling and at home, and he had certainly never slipped or fallen in them. He thought, therefore, there was nothing to justify the inference that it was necessary, in order to get good over-shoes or goloshes, to keep at home. He did not doubt, however, but that the best were made in England, and that for the best of all reasons, that more care and pains were taken in their manufacture, and a higher price obtained for them; as in other matters, where the price was cheaper, it was because the commodity was inferior.

The **Chairman** expressed the gratification with which he had listened to the interesting paper they had heard, and moved that the cordial thanks of the meeting be presented to Mr. Hall for the communication with which he had favoured the Society. The resolution was passed unanimously.

Mr. **Hall**, in acknowledging the vote, remarked that he felt much satisfaction in observing that through the various changes which the fashion of boots and shoes had passed, we had, at last, arrived at the common sense of the matter; and it was to him a source of considerable gratification, that persons of exalted station were endeavouring, by their example, to show the best mode of ensuring health in those matters, by wearing shoes sufficiently wide and abundantly long. By observing these rules, and having shoes made on lasts consistent with the anatomy of the foot, they would be enabled to get through the world without the annoyance and torment arising from wearing badly made boots and shoes.

The Secretary announced that at the next meeting of the Society a paper would be read on Uniformity in Weights, Measures, and Monies, by Professor Jack, of New Brunswick.

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## LECTURES ON COTTON.

The first lecture of Mr. Warren's course on the History, Trade, and Manufacture of Cotton was delivered on Monday, the 14th ult., and was received with much interest by a large audience.

Mr. Warren commenced his subject with a brief account of the nature of cotton itself; the natural history of the cotton plant; the varieties of it which are known to botanists, or cultivated by planters; and the distribution of those varieties in different parts of the world. Having explained the nature of the fibre, and the conditions under which it is formed in the pod of the cotton-tree, he showed that the first thing to be done was to separate the cotton from the seeds with which it was naturally associated in the pod, and described and exhibited the American saw-gin, showing the manner in which, by the combination of circular saws and revolving brushes, the fibre was torn off from the seeds, which remained in the machine, whilst the clean cotton was driven out at the one side.

The rapid development of the cotton trade, and its vast and increasing importance, were next pointed out; and it was shown how, in comparatively few years, the trade in cotton had increased from some hundreds of bales to such a quantity that now more than a thousand tons of raw cotton were employed by the manufacturers of this country every day. Mr. Warren then explained the uncertain nature of the supply of raw cotton, and the very serious consequences which would arise to this country if any interruption in the supply were to occur, as between two and three millions of persons are now occupied in the manufacture, and as the manufacturers never have more than three months' supply in store. He showed that such an interruption might at any time occur, even without supposing any material quarrel or misunderstanding to be brought about between the two nations; it might be caused either by the gradual working of the great slave question, or even by the mere combination of speculators.

The lecturer then pointed out some of the other sources from which a supply of raw cotton might be obtained, and especially adverted to the great and peculiar advantages possessed by our East Indian possessions for the cultivation of cotton. He stated that it was now well ascertained that any quantity of good cotton, of that quality most practically useful to our manufacturers, might, with proper management, be raised and imported from India.

## INTERCHANGE OF PRIVILEGES.

Three months since a circular was sent to the Institutions in Union, suggesting a general interchange of privileges amongst the members of different Institutions; it being proposed that a member of any one Institution should have admission to the libraries, lectures, or meetings, and should, in fact, for the time being, enjoy all the privileges of membership of the Institutions of any other town which he might happen to visit. This plan has for some time been tried on a small scale in counties and local unions; and as it appears in every case to have met with complete approbation, and to have worked in a very satisfactory manner, the proposal was made to extend the system to the whole country. Accordingly, at the end of last October, a circular was sent to each Institution, suggesting the adoption of a general and uniform card of membership, as a convenient mode of carrying out such an interchange of privileges, and inviting an expression of opinion in favour of, or against, the plan. As a quarter of a year has now elapsed since this was done, and as inquiries are beginning to be made respecting the answers received, it will be well to state briefly the result.

It is obvious, in the very outset, that some difficulties would arise, and that a good many objections would probably have to be overcome before such a system could be generally carried out; but as it is obvious that it would increase the power and usefulness of Institutions, and encourage the friendly intercourse and co-operation of the members of the different Institutions, it would be well worth trying to arrange and overcome all minor objections in order to secure so important an end.

Out of two hundred and thirty Institutions to which the circular was sent, replies have been received from one hundred and twenty, and of these one hundred and thirteen fully approve of the plan, and are willing to adopt any suitable mode for securing to their members the interchange of privileges. Of the remaining seven, two are precluded by their constitution from adopting the interchange, though fully alive to its importance; two postpone the subject for the present; one is willing to adopt it with Institutions of the same denomination, that is to say, with "Literary and Scientific Institutions;" and two decline it altogether.

Of course, in some cases, little local difficulties are mentioned, which will no doubt be arranged without much trouble by the Managers or Committees; but all things taken into account, the replies must be considered as remarkably unanimous in their approval of the system of interchange; and, indeed, it may now be regarded as settled, that a very large number of the Institutions in the Union have adopted it. It is probable that some of those who have not yet replied to the printed circular of last October will desire to participate in the interchange of privileges, now that its adoption by so large a number of the principal Institutions is announced; and therefore, to give them an opportunity of doing so, the publication of the names of those which have already approved of it, is delayed to this day fortnight.

It is obvious that each Institution must make such rules and regulations for the admission of visitors as are most convenient; and that in cases where the limitation as to distance is found to be inconvenient, it may be modified or altogether dispensed with. The adoption of a uniform card of membership, though approved by many Institutions, has not been adopted by all; and though it would have unquestionably simplified the mode of action, yet it is by no means essential to the principle itself, for which it will be enough that every Institution agreeing to the system of interchange shall have a list of all those with which it is thus placed in friendly intercourse. Several Institutions have objected to the idea of adopting a new form of members' cards, and various difficulties have been raised. To meet these, it has been suggested that a limited number of uniform "travelling cards" should be supplied to each Institution, bearing on the one side the name of the member to whom it was granted, and on the other a list of all the Institutions to which it would admit him, constituting, as it were, a kind of circular letter of introduction, which would only be applied for by those likely to visit other towns.

EDWARD SOLLY.

*January 28th*, 1853.

## COLONIAL AND INTERNATIONAL POSTAGE.

SIR,—Permit me to hand you a few extracts from letters recently received, for which I hope you will be able to find room in your journal.

Your obedient servant,
G. W. YAPP,
*Cor. Sec. Postage Association.*

Boston, Massachusetts, Jan. 14, 1853.

I perceive by the published report of the proceedings of the International Cheap Postage Association, in London, that you are its Honorary Secretary; hence I take the liberty of troubling you with this note.

I have been for more than twelve years devoted to the same cause, and have at last succeeded in obtaining a radical reduction of the rates of postage on inland letters, newspapers, periodicals, and printed matter, in the United States; since that has been accomplished, my attention has been directed to the reduction of Ocean postage. In view of the Industrial Exhibition which is to take place next summer in the city of New York, I have, in a circular, recommended the establishment of an Association composed of gentlemen from Europe, and different parts of the United States, who may then be present, to act in concert with your Association in effecting the reduction of the rates of Ocean postage.

I am now in Boston, endeavouring to arouse its influential merchants and citizens to take an active part in this matter. I hope to establish Associations here, and in all our principal cities, during the present winter, and to forward a large number of petitions to Congress at its present session, although I have little hope of any legislative action.

I have received no definite information of the actions of your Association since it was first organised; if I could learn what it has done, and is now doing, I would cause its proceedings to be published in our newspapers, because it would encourage and stimulate our people to follow your example.

To carry this measure into complete effect we must have the co-operation of the several Governments of Europe; if, however, a tripartite postal treaty could be entered into by Great Britain, France, and the United States, the other powers would of necessity be compelled to follow their example. It is, however, desirable that the action between our Government and yours should be simultaneous, and hence the necessity of our being made acquainted with the exertions of the people of both countries in behalf of this measure.

Yours, &c.,
BARNABAS BATES.

Hampstead, February 7th, 1853.

MY DEAR SIR,—I have well weighed the subject since I had the pleasure of meeting you, and have come to the conclusion that if the system of general penny postage is adopted, it will tend more to the advancement and prosperity of both the colonies and the mother country than any other measure that has been carried out since we became a colonizing people. It strikes me that the only question likely to arise will be connected with an anticipated decrease of the Post-office revenue: but I believe that any objection on this score will disappear before inquiry. As far as regards the Indian Archipelago, about which I am competent to form an opinion, having resided for the last four years at Singapore, I am convinced that the increase of revenue from the penny system will be incalculably great; for, in addition to a large increase in the number of letters, circulars, prices-current, &c., the Post-office will be availed of very extensively for the conveyance of samples, books, &c. The amount realised from this new source of postal revenue would at once exceed that derived from the postage of letters, even at the present high rate; and it would be increased indefinitely when the facilities afforded by the new system came to be known and appreciated.

GEORGE WINDSOR EARL.

February 14th, 1853.

To show you how people evade the high rate of postage, I may mention that with the enclosed note I received in one envelope four others, making five letters for one rate of postage (1s. 10d. overland). Frequently I have eight or ten enclosed. Had the postage been only a penny, every letter would have been sent direct, and probably twice the number written. F. A.

THE following extracts from Mr. Rowland Hill's pamphlet, containing his original proposals of Penny Postage, will be read with interest, as containing his views at that time upon the subject of Foreign and Colonial Postage:

For the sake of simplicity in accounting for the postage, it is very desirable that the foreign and colonial letters should be subjected to, as nearly as practicable, the same regulations as inland letters.

As, however, it will probably be impossible in all cases to provide for the English postage on letters received from foreign countries being paid in advance, some peculiar arrangements with reference to foreign letters appear to be required. The mode of dealing with them, which suggests itself to my mind, is the following.

Let all foreign letters, on leaving this country, be subjected to a double rate of English postage, but let foreign letters received into this country be delivered free. The postage claimed by the foreign government being in each case paid by the foreign resident.

This arrangement would appear to obviate the necessity for all negotiation with foreign governments on the subject of postage, and it would be practically the same in its results as though the English postage were charged in both directions; the only difference being (with few exceptions not worth regarding,) that in an interchange of letters the English resident would pay his share of the postage at once instead of at twice. The covers used should be legibly marked, "Foreign Letter," and sold at uniform rates.

If, as I would recommend, the rates of postage already proposed for inland letters were extended to foreign letters, the prices of covers for foreign letters would be exactly double those for inland letters; but as it appears necessary to treat foreign letters differently from others, no inconvenience would arise to the operation of the general plan if the prices were higher.

For the sake of simplicity it appears desirable to treat all foreign letters alike, although certain Governments might be willing to require payment of the whole postage in advance, and to account to the English Government for the English portion.

And as, in many minds, the distinction between a foreign country and one of our colonies is not clearly defined, it would be desirable, perhaps, that colonial letters should be placed under the same regulations as foreign letters. If this were done, the covers would be marked, "Foreign or Colonial Letter."

The reduction here proposed in the postage of foreign and colonial letters might easily be effected, for the increase in the number would be such that the payments for ship-letters might be reduced from twopence, the present rate, to a farthing each, and yet amply remunerate the masters of vessels.

There is, perhaps, scarcely any measure which would tend so effectually to remove the obstacles to emigration, and to maintain that sympathy between the colonies and the mother country, which is the only sure bond of connection, as the proposed reduction in the postage of colonial letters.

The importance of promoting voluntary emigration from Ireland in aid of the Poor Laws, renders this consideration, at the present time, deserving of the greatest attention.

## ESTABLISHMENT OF DISTRICT SCHOOLS OF PRACTICAL ART IN THE METROPOLIS.

THE following announcement has just been issued by the Department of Practical Art: "Her Majesty's Government having required that the premises in Somerset House, now occupied by the School of Design, should be forthwith given up for the use of Public Offices, and having instructed the Department of Practical Art to assist in establishing Schools of Art and Elementary Drawing Classes, in connection with Public Schools in several districts throughout the metropolis, in order to supply the Elementary Instruction heretofore given at Somerset House, NOTICE IS HEREBY GIVEN, that the Department of Practical Art, upon receiving requisitions from parochial and other authorities, will be prepared to aid in forming such District Schools of Art and Elementary Drawing Classes. A suitable room or rooms, with lighting and firing, will have to be provided by the local authorities, towards defraying the expenses of which certain fees received for instruction may be applied, and the Department will appoint, and guarantee the salary of, a suitable master, and assist in providing a supply of copies, examples, models, &c., for the use of the students. Further information may be obtained at the offices, Marlborough House, Pall-mall.

"W. R. DEVERELL, *Secretary*."

## HOME CORRESPONDENCE.

### LEGAL POSITION OF INSTITUTES.

South Grove, Highgate, 15th Feb., 1853.

MY DEAR SIR,—The Report of the Institutes' Committee on the Legal Position of Institutes, and Mr. Ryland's interesting letter published in the last Journal, will, I hope, educe that thorough discussion of the subject which alone can lead to its satisfactory settlement.

I propose now, in my private capacity, to make a few remarks upon the question of the exemption of Institutions from local rates.

It seems to be quite clear that the Exemption Act, 6 & 7 Vic. c. 36, must be either amended or repealed. I am of opinion that it ought to be absolutely repealed. I never could understand upon what principle it was founded; upon what grounds of reason or equity the Institutions should be exempted from that local taxation to which almost all other descriptions of property are liable.

If it be argued that the Institutions are useful, I reply, so are booksellers' shops and cotton mills. If that the Institutions are not only useful but disinterested, established and maintained with no view to pecuniary profit, I reply, so are religious and charitable associations, the clubs of London, chambers of commerce, and numerous other establishments. But it can scarcely be asserted that the Institutions are disinterested bodies. No doubt we do not expect, and we cannot receive, any dividend or pecuniary bonus; but do we not combine in an Institution, as in a club, for the purpose of obtaining, by combination, to a greater degree and at a cheaper cost than would otherwise be obtainable, those advantages which Institutions are intended to confer? Why, then, should we by combination be enabled to escape from those social charges which, singly, we should each have to pay in a far higher proportionate rate?

Nor can it be argued that it is poverty alone which is relieved under this statute. It relieves some of the wealthiest Institutions in the kingdom, some of those which are the chosen resorts of aristocracy.

The Parliamentary Lists of Institutions exempted under the Act, exhibit the titles of the following among many other Societies. The Royal Institution of Great Britain, Royal Botanical Society, London Zoological, Horticultural, Religious Tract, Royal Society, Civil Engineers, United Service Institution, Astronomical, Statistical, Geological, Asiatic, Linnæan, Agricultural, Art Union, Diffusion of Useful Knowledge, Arts, Commerce, and Manufactures, Royal Society of Literature, Royal Academy of Music, London Library, Antiquaries, College of Chemistry.

These surely cannot be exempted on the score of poverty.

The whole system and theory of these exemptions from local taxation appear to me to be erroneous and mischievous, mere remnants of an exploded policy of protection and bounties. Surely it is beneath the dignity of the Institutions to appear in *formâ pauperis*, as unable to bear their fair share of the burdens to which other property is liable. Surely it is not by such small evasions of expenditure that the Institutes are to gain strength and *status*, and to work out their important objects.

I am, yours, very faithfully,

H. C.

SIR,—Allow me to say a few words on the Report of your Institutes Committee, where that Committee proposes to prepare a bill to contain (amongst other things) a clause declaring that the School Sites Acts, five in number, shall be applicable to Institutions, as if they were schools contemplated by those acts. With all deference to the Committee, I fear this would be but of little benefit. In the first place, the acts themselves, beside being ill drawn, are intended to apply to schools and the circumstances specially connected with them, and to be worked by a machinery applicable to schools, but not to Institutions. The acts, too, have been passed to repeal, amend, and supply deficiencies to each previous act; but the confusion is enormous. I need scarcely, say it would be no boon to an Institution to be entangled in such a complication. There is no more fertile source of uncertainty and litigation than the common practice of incorporating by reference to an act relating to one subject, provisions (however good in principle), intended to apply to others. If the principle of the provisions be good, let it be adopted and carried into effect by distinct clauses, carefully framed, with words apt for the subject. Besides, consider the no small inconvenience of having on every occasion to refer and read five other Acts of Parliament, in addition to the one specially relating to Institutions. I would suggest for the consideration of the Committee, carefully to collect all the laws specially relating to or affecting Institutions, and let the proposed Act of Parliament repeal all such existing laws, re-enact such as it is deemed desirable to retain, and, in addition, contain all such new special provisions as may be deemed necessary. Let the proposed act be, in fact, the code regulating the special government of Institutions. It appears to me, as worthy of consideration, whether, as a mode of securing the property of Institutions, both real and personal, each should not, under proper regulations, become corporate bodies, having perpetual succession, enabled to take and hold lands of a limited amount for sites. This would remove a vast deal of complication as to trustees and renewal of deeds of trust, which, by-the-bye, is only very partially provided for by the School Sites Acts, and by means of a machinery scarcely applicable to the case of an Institute. Your's, &c.,

F. P.

### NEW INVENTIONS.

SIR,—Mechanics' Institutes frequently have opportunities of acquiring the earliest knowledge of valuable inventions and improvements, or of becoming possessed of original and authentic information, of general interest, on subjects connected with Arts, Manufactures, and Commerce. Allow me to suggest that much additional good might result in this direction from the union of local Institutes with the Society of Arts, if it were more generally known that on such occasions brief communications addressed to the Secretary will be courteously received, and, if deserving, readily inserted in the Society's Journal; and that in cases of importance the Council will be willing to take such other steps as may be required for public advantage, or may be claimed by individual merit. Yours, &c.,

T. Twining, Jun.

### SPECIAL PRIZE.

Sir,—It cannot but appear that the subject of this Prize deserves all the consideration well-stored and experienced minds can give it. It is a subject also very aptly chosen at this time, following, as it does, on the heels of the extensive association now made between the various Literary and Scientific Institutions of this kingdom and the Society of Arts. I fear it must, at the same time, be allowed that it is a subject very difficult to meet with satisfaction, and a hope of success from any one or two essays, however powerfully written, on account of the active and negative opposition which is offered by too many people, very influential both in purse and position. At the same time, this conviction should not discourage, but rather stimulate the more enlightened members of the Society of Arts, if not to remove, at least to endeavour to temper, by the most powerful reasons they could advance, that opposition to Institutions which so much, in the provinces especially, helps to paralyse the best efforts of managing committees, and to cripple their funds. Of the individuals who more especially hold back their patronage, we may first name those who "live at home at ease," and have neither heard and read anything (as they say) yet to convince them that a Scientific and Literary Institution is now as much a national necessity in a district, as our national defences may be, or any other national establishment. Then there are others, who possess and enjoy literary and scientific knowledge themselves, are yet jealous of its spread amongst the people, and would rather continue to astonish than humanize, or enlighten their neighbours. Others there are again, and a formidable number too, who, though not absolutely opposed to, or unfavourable to Institutions, are, though qualified in ability and purse to assist them, either too indolent or too proud "to lend a hand;" and as this is an age in which there is almost a childish struggle for "caste," there are not a few sufficiently contemptible and shallow who believe they are taking low ground when they are seen within the walls of a provincial Institution. Did I not fear to occupy too much space in your valuable Journal, I could enlarge on other causes of injury and impediments to the prosperity of Institutions; but for the present I will but venture to say, that I humbly think that those who enter the lists to write an Essay on the History and Management of Literary and Scientific Institutions, will promote a great public good, if they can with some success give the above remarks I have taken the liberty to advance ample and serious consideration.

It is stated by one who signs himself "Delta," in your Journal of January 28th, that though Institutions were primarily designed for the operative portion of the community, that they have fallen into the hands of the middle classes. This is most true; and I am one who thinks that Institutions, to be ultimately useful and extended, as proposed in a circular lately sent amongst us, to the operative classes, cannot remain in better hands than in those of the middle classes, assisted and supported moreover by the upper classes; for out of the two latter classes we can chiefly look for that support, influence, encouragement, and example of order, which give steadiness and impulse to these Institutions. For though Government may be very properly appealed to to assist Institutions in carrying out and extending their present operations for the benefit of the operative classes, it can hardly be expected that the Government will be able to assist 200 Institutions with more means than shall enable well qualified establishments to provide themselves with good librarians, to assist as teachers and expounders, and a certain extent of lectureships, according to the taste and vocations of particular districts; and, perhaps, a sum for prize medals and essays.

There is one more rather material point I will venture to name in conclusion, which we may hope will be considered by those who write on the subject of Institutions. It cannot but be observed that there is frequently much too strong a political and even religious bias working for or against Institutions. Now this should be, if possible, got rid of; for in many districts it acts as a very fatal obstacle to advancement. A Literary and Scientific Institution should be free of all such taint, and all within its walls should conscientiously work on neutral ground. Whatever be the politics or religious bias of those who take a lead in Institutions, it should be a point of honour to merge all in one feeling of perfect patriotism and pure religion.

I have the honour to be, Sir, faithfully yours,

William Landen Hopkinson, M.D.

St. Martin's, Stamford.

Feb. 6, 1853.

### PHOTOGRAPHY.

107, Regent-street, 7th February, 1853.

Sir,—Taking a great interest in all improvements capable of being introduced in the art of photography, I should be glad to understand the exact meaning of the letter of your correspondent, Mr. Reveley, respecting the advantages of substituting a blue achromatic object glass for the clear white ones generally used, and in order to promote further explanations, I shall be obliged by your insertion of a few remarks suggested by Mr. Reveley's communication.

I do not see what chromatic or spherical aberration has to do with the deficiency of "artistic effect so much complained of in photographic pictures" (Mr. Reveley ought to have added, in *bad* photographic pictures).

The images produced by perfect object glasses, such as those which can be procured from good opticians, are so nearly identical in outline and form, and in light and shade, with those obtained on the retina, that their only deficiency is the absence of natural colours; unfortunately a problem, the solution of which is so remote that we must be satisfied to leave to our successors this prospective discovery.

I therefore quite agree with Mr. Reveley that the want of artistic effect, "cannot be attributed to the camera, because the views in a camera, as seen by direct vision, are a true and faithful representation of Nature itself." But I disagree with him when he adds, "that in sun pictures there is a third source of error in actinic aberration, or the difference of refrangibility between the actinic or chemical, and the pure light rays."

This source of error does not exist; because good object glasses will bring to the same focus all the chemical rays, in fact, achromatise luminous rays, as perfectly as the luminous rays are achromatised in the image seen on the ground glass of a camera obscura. The chemical rays do not contribute in any sensible degree to the formation of the luminous image, nor the luminous rays to the photographic image.

For this reason, a good achromatic object glass may give a perfect luminous image on the ground glass, and a perfect photographic image on the sensitive tablet. It is true that these two images have generally two different foci, but if the photographer knows how to obtain the correct photographic focus (and nothing is so easy), he can obtain on his tablet a picture as true and faithful as that exhibited on the ground glass of his camera.

These facts have been fully investigated in various papers I have published on the subject, and I refer your readers interested in it to the *Philosophical Magazine*, February, 1848; March, 1848; November, 1848; November, 1849.

An object glass cannot be too white, and white is preferable to blue; it is true that between a glass tinted yellow or green, and one tinted blue, the preference should be given to the blue; but I am convinced that there can be no advantage in substituting a deep blue tinge for the colourless glass.

A very simple experiment will convince Mr. Reveley that he will gain nothing by a deep blue object glass, which would have the great disadvantage of obscuring the visual image so much that it would be impossible to focus the camera.

If he covers one half of an engraving with a deep blue glass, and the other half of it with a clear white glass, he will obtain on the photographic tablet as correct an image of the second half as of the first, and he will find to his astonishment that although he has stopped all the red and yellow rays in the half covered with the blue glass, the half reflecting the chemical rays with these objectionable "red and yellow rays," will be as perfect and well defined as the other, and deficient in none of its artistic requirements.

As regards the best mode of obviating the various aberrations and refrangibilities of the chemical rays, a blue lens cannot have the least effect in correcting that aberration; and I do not understand how, with a blue object glass, sun pictures would be more true and uniform in appearance, and would possess that artistic effect, the absence of which is so very detrimental.

The artistic effect depends upon the taste of the operator, and not in the least degree upon the achromatism of the lens; and when that artistic effect is deficient he must not accuse the optical instruments, no more than the art of the photographer, which fortunately is susceptible of displaying as much true artistic feeling as any other art.

Notwithstanding the stale jokes with which some clever writers—but whose scientific and artistic abilities do not seem to equal their classical attainments—condescend to amuse their readers with grotesque descriptions of all the defects of a bad photographic portrait,—photography, properly conducted, can produce a perfect and pleasing delineation of the human face, and its defects, like that of bad music or bad painting, are the defects due to the ignorance or carelessness of the artist, or to bad apparatus, and not to the art itself.

I am, Sir, your obedient Servant,

A. CLAUDET.

## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ENTOMOLOGICAL, February 7.—E. Newman, Esq., President, in the chair. John Garland, Esq., was elected a member, and F. T. Hudson, Esq., a subscriber to the Society. The President returned thanks for his election, and nominated, as Vice-presidents, W. W. Saunders, Esq., W. Spence, Esq., and J. O. Westwood, Esq. Mr. D. Hanbury exhibited some of the white insect-wax of China, and the insects from which it was obtained; respecting both of which he read from the "Journal of the Agricultural and Horticultural Society of India," a very interesting account. The wax is harder, and is fusible at a higher temperature than bees-wax: it has been imported, and found useful in various ways in this country, but is too expensive for general employment. Mr. Westwood said the insects exhibited were wingless females of a species of *coccus*, and their bodies were entirely permeated with wax. He exhibited several species of *coccus* from various parts of the world, all of them being producers of colouring, or waxy matter. Mr. Baly exhibited specimens of bees, which had been preserved in spirit, and restored to their original beauty by washing with soap and warm water, and drying with blotting-paper. Mr. Spence exhibited specimens of *glossina mersitans*, the African fly, known as "Tsétsé," communicated with a note on its habits, to Dr. Quain, of Harley-street, by William Oswell, Esq. Several additions to our knowledge of this insect were made by the reading of this note. Three or four flies are sufficient to kill an ox, death ensuing in from three to twelve weeks after being bitten; and on one occasion, Mr. Oswell lost forty-nine out of fifty-seven oxen. The poison seems to grow in the blood, and through it to attack the vital organs. All domesticated creatures, except goats, calves, and young sucking animals, die from the bite of this insect; man and all wild animals are bitten with impunity. The fly is confined to particular spots, chiefly between 18th and 15th degrees of south lat., and 24th and 28th degrees of east long. The following papers were read: 1. A short account of three specimens of *Vanessa Io*, found hybernating, which emitted a slight but distinct sound upon being disturbed, by the Rev. Joseph Greene. 2. Descriptions of some new Longicorn beetles, brought from China by R. Fortune, Esq., by W. Wilson Saunders, Esq.; and, 3. Description of some new *Curculionidæ*, by G. R. Waterhouse, Esq.

ZOOLOGICAL SOCIETY, Feb. 8th.—J. Gould, Esq., F.R.S. in the chair. Dr. Baird communicated a paper "On new species of Entozoa, contained in the National Collection, at the British Museum," which he described under the following names: *Ascaris similis*, *A. lævissima*, *A. bifaria*, *Gordius platyura*, *G. Tolosanus*, *G. Verrucosus*, *G. Violaceus*, *G. Pustulosus*, *Mermis rigidus*, *M. spiralis*, *Pentastoma megacephalum*, *Tetrarhynchus rugosus*, *Tænia Bremseri*, *T. Calva*, *T. Zederi*, *T. Goesii*, *Bothriocephalus antarcticus*.—Dr. Gray communicated a description of the animal of *Cyclina sinensis*, which he stated was drawn up ten or twelve years ago from a specimen presented to him by Mr. John Reeves, to whom we are indebted for the knowledge of the greater part of the animals of China, with which Zoologists are as yet acquainted. The animal in most particulars agrees with that of the genus *Dosinia*, next to which Dr. Gray lately proposed to place it in his arrangement of the genera *Veneridæ*.—Mr. Adam White contributed a monograph of the genus *Œgosoma*, of Serville, with the description of *Cyrtonops*, a new genus allied to it, for the type of which he proposed the name of *Cyrtonops punctipennis*. It was obtained in India. The additions to the genus *Œgosoma* are remarkable, and five in number, viz.: *Œgosoma sinicum*, collected by Mr. Fortune, at Shanghai; *Œ. ornaticolle*, from India; *Œ. cingalense*, from Ceylon; *Œ. sulcipenne*, collected by Mr. Packman, in Tenasserim; and *Œ. tibiale*, from northern India.—The Secretary read to the meeting some extracts from notes on the Zoology of the Malay peninsula, with which he had been supplied by Mr. George Windsor Earl, whose long residence in the Indian Archipelago, had given him abundant opportunities for observation. Among the most remarkable animals alluded to, were two species of wild cattle of immense size, to which the natives give the names of *Sapi* and *Saladang*. The Secretary exhibited on the part of Mr. Richard Hill, corresponding member, a beautiful series of Birds' Eggs, collected by that gentleman in Jamaica, and therefore authentically named. It is greatly to be regretted that a considerable number were broken in their transit to this country, or during their detention at Southampton. The extreme beauty of these eggs, and the certainty with which they have been determined, give an unusual value to this donation, although Mr. Hill has ever been regarded as one of the most active and intelligent contributors to the objects of the Society, in connection with the Zoology of the great island, in which he has so long resided.

INSTITUTION OF CIVIL ENGINEERS, Feb. 15th.—J. M. Rendel, Esq., President, in the chair. The Paper read, was "On the use of Heated Air as a motive power," by Mr. Benjamin Cheverton.

The author, in a short historical notice, stated that Sir George Cayley had written on the subject in 1804 and 1807, and had subsequently built several engines, but that the Messrs. Stirling, of Scotland, produced the first really efficient engine, working by means of heated air, in the year 1827; in the same year Messrs. Parkinson and Crosley brought forward their Air Engine; that Mr. Ericsson, following more closely the arrangements and form of the ordinary steam engine, constructed an air, or a "Caloric Engine" as it was termed, in 1833;—Messrs. Stirling patented further improvements in 1840, and in 1845 their engine was described to and discussed at the Institution of Civil Engineers;—in 1851 Mr. Ericsson brought forward his present form of engine;—and that the principle acted upon in both these latter inventions, and announced as an important discovery in motive mechanics, was the reiterated use of the same caloric, in the production of power. The mechanical means of realizing this idea were described, and it appeared that in both inventions they were substantially identical. The ejected hot air by being brought into contact with an extensive metallic surface, of wire gauze, was deprived of its heat, which the next moment was imparted to the incoming cold air, and thus the ultimate use of the furnace was only to supply the unavoidable waste of caloric by radiation.

This view of the subject was strongly contested, as being inconsistent with the best established laws of nature, and as involving the idea of the possibility of the creation of power. It was argued at some length, that the employment of caloric as a motive agent, consisted in the development, from molecular forces, of a dynamic force, and as such, was directly amenable to the third law of motion—that of action and reaction being equal and opposite. It was contended, that sensible caloric was not an indication of the presence, but of the abeyance of mechanical action; that these were interchangeably convertible quantities; and consequently, that a working force could appear, only as heat disappeared—a conclusion entirely opposed to the assumed principle of the "Caloric Engine," that "caloric could be made to operate over and over again." It was admitted, however, that there was an apparent anomaly in the application of the law of action and reaction, when caloric was in question, in the fact, that its quantity was not less after than before the generati of steam power, if it were estimated conjointly by wat and temperature. But it was explained, that a cau might have two classes of effects, and might require tv distinct and different measures, to indicate its enti efficiency; that while caloric might remain intact, und the aspect adverted to, it lost by a declination in t intensity of its temperature, for which the equivale gain was a dynamic force—a conclusion as adverse before to the idea that such force could be acquir without cost. It was, in short, in the aspect of a *viva* "force" in caloric, that the development of mech nical action must be considered. These views we further explained and illustrated, by a reference to t analogous difference between momentum and the mo practical modification of power, named by Smeaton a Watt, "mechanical power," "work," and "duty; and it was shown that here also an apparent discrepan existed in relation to the third law of motion, but whi was cleared up when both the measures of power—th by time and that by space—were appropriately used.

It was contended, that the "Caloric Engine" wi analogous to a non-expansive high-pressure stea engine, which it would exceed in wastefulness of hea if it were not provided with, what its inventor impr perly termed, a "Regenerator;" the office of which it was insisted, was simply to absorb the unutilized sen sible caloric of the escaping air, which, as compare with steam, was in very large proportion to the efficien caloric; and to afford another opportunity for its being converted into force, thus compensating for the loss o expansive pressure. An explanation, founded on these considerations, was given of the continued action of th engine, for some time after the fire was withdrawn— fact which had been advanced in support of, what wa styled, the untenable hypothesis of a "regenerator o force."

Although the mechanical effect of heat might b proved to be independent of the chemical condition, i not, also, of the physical constitution of bodies, it wa admitted, that economy of fuel, as being a distinct question from that of economising the caloric already in possession, was eminently a practical matter, only to b determined by experiment; and in this point of view it was explained, in what manner the reception of heat, at a much higher temperature than steam, was greatly in favour of air as a motive agent; but, on the other hand, many adverse considerations were adduced, tending to show the impracticability of the system, in its present form.

In conclusion, it was shown, that the "Caloric Engine" did not rest on true principles, exclusively its own,—that its merits stood upon common ground with those of the steam engine—and therefore, that even should the performances of air be found superior to those of steam, it could not be anticipated that the former would immediately supersede the latter; but, as far as public statements could be relied on, the performances of the air engine on board the "caloric ship," *Ericsson*, were very unfavourable to the pretensions of the promulgators of the plan.

The discussion was commenced by an exposition of the several systems adopted by Sir G. Cayley, Stirling, Parkinson and Crosley, and Ericsson, illustrating them by diagrams; whence it appeared, that the most preferable mode of heating the air was that of Sir G. Cayley, by directly traversing the incandescent fuel; that the great improvement recently introduced by Ericsson, was the wire gauge regenerator, which, however, formed an integral part of Stirling's original design. The practical difficulties of the immense dimensions of the heating vessels and cylinders, and the rapid destruction of the metallic parts, were fully considered; and it was admitted, that although at present there did not appear to be any positive recorded results more advantageous than by the use of steam, it would be wrong to discourage the attempt to use heated air, and to overcome the inherent difficulties of the system.

Allusion was made to the appendix, to a tract, published by Mr. A. Gordon, wherein it was shown that the volume of the gases into which one cubic foot of anthracite coal was decomposed, under atmospheric pressure, was 219,250 cubic feet; that the volume of air required to sustain combustion, was 14,273 feet; the mechanical power developed was 473,000,000 lbs., raised one foot. It was proposed by Mr. Maxwell Lefroy to pass these gases through water, in order to purify them from grit, &c., and to cool them to a convenient temperature, and then to use them, together with steam, in power cylinders. He proposed a system of co-axial cylinders, of which the central one was the furnace, the two next were cylindrical shell boilers, the water in the inner one of which completely covered the surface of the furnace,—that in the outer one having its surface always below the insertion of the gas pipes in the furnace; the exterior shells being for the purpose of gradually heating the air, in its passage to the furnace, so that the exterior shell, which alone sustained the bursting pressure, was always cool.

About one seventeenth part of the power produced would be expended in forcing in the air required to sustain the combustion of the fuel. The coal-hopper was co-axial with the furnace, and was kept cool by the supply water descending through its hollow shell, into the interior.

The system would be one of high pressure, and some of its advantages were assumed to be—the absence of a funnel, saving three-fourths of the fuel, safety from explosion, with economy of first cost, space, and labour.

The discussion of the paper was adjourned until the meeting of Tuesday, February 22nd, when it was announced that the whole of the evening would be devoted to the subject.

## PROCEEDINGS OF INSTITUTIONS.

**Camborne.**—Mr. Davis, the Secretary of the Truro Literary Institution, delivered a lecture on Monday evening, the 7th ult., intituled "An Evening with Thomas Hood." The lecture was amusing and instructive. Mr. Davis did not agree with London lecturers in the way they treated the subject of Hood's life, which, he thought, tended to give the public a false idea of his real character. The principal part of his jokes and puns were written as the only means of providing their author with the common necessaries of life—and, moreover, joking was not the kind of intellectual food that a Literary and Scientific Institution ought to distribute to its members.

**Cheltenham.**—Since our last notice, three more lectures of the present course have been delivered to the members of the Literary and Philosophical Society. Dr. Humphreys' second lecture was on "Anglo-Saxon Brethren." It showed very powerfully the important parts which England and North America are still destined to take in the progress of civilization; and the advantages of their friendly union. Mrs. Balfour (the week following) delivered one of her beautiful discourses, "On Home Influences and Early Impressions," with graceful and touching eloquence; and the President (W. M. Tartt, Esq.) gave, on Tuesday last, a lecture "On Italians of the Fifteenth Century," containing illustrations, chiefly from original sources, of the literary, social, and political state of Italy at the period referred to; with passing applications to the present times. The reception of the whole of these lectures may be taken as evidence that this mode of conveying information is still popular.

**Exeter.**—On Friday last, Sir Stafford H. Northcote, Bart., delivered a lecture on "The Relations of Theory and Practice," to the members of the Literary Society. The lecturer commenced with an allusion to the confusion, the prejudice, and the antagonism, existing in our notions respecting the right relations of Theory and Practice, as a striking evidence of the imperfection of our knowledge. The original meaning of the word Theory, which was of Greek origin, meant pretty much what we now called speculation. After alluding to the speculation of the Greek philosophers, the period of the Reformation and Lord Bacon, the lecturer said that the fault of the English in the present day—the danger to which they were most exposed—was that of becoming too exclusively practical, of too much neglecting and undervaluing scientific knowledge. The prejudice against theory had overshot the mark, and had led those who desired to be practical into a contempt for science itself, which it was feared would produce most disastrous results. The lecturer concluded with a noble extract from Lord Bacon, showing the end, or object, with which knowledge should be sought for, "not as a courtesan, for pleasure and vanity only, or as a bond-woman, to acquire and gain to her master's use, but as a faithful and honoured spouse, for generation, fruit, and comfort."

**Highgate.**—On Monday, the 7th instant, a special meeting of the Committee of the Literary and Scientific Institution was held,—Harry Chester, Esq., President, in the chair,—for the purpose of electing Richard Dugard Grainger, Esq., F.R.S., to be an honorary member of the Institution. The following is the rule under which such appointments are made:—"Honorary Members shall have all the privileges of membership, without the payment of subscription; they shall be elected by an absolute majority of the whole Committee of Management; and shall be persons of great eminence in literature, science, or the fine arts, or otherwise highly distinguished, or especial benefactors to the Institution. No one shall be elected an Honorary Member on account of rank or worldly position." This was the first occasion of any appointment under the rule, and the attendance was very numerous. Mr. Gainger, who resides at Highgate, and has on many occasions given excellent lectures to the Institution, was unanimously elected.

**Lymington.**—On Tuesday evening the Rev. S. S. Pugh, of Southampton, delivered a Lecture to the members of the Literary Institution, "on Newspapers." Having traced the origin of these popular productions to the troubled period immediately preceding the Commonwealth, the lecturer spoke of the vicissitudes they had experienced under successive reigns; the total extinction of the liberty of the press in the times of Charles II. and his successor James II.; its revival with the accession of William III.; the restrictions, in the shape of taxes, imposed upon the press during the reign of Anne; its increasing importance and influence, and the difficulties with which it had to struggle, in the reigns of the Georges. The lecturer then expressed an earnest wish for the abolition of the newspaper and advertisement duties, which would, he thought, be attended with the happiest results; and, in conclusion, trusted that this country might long enjoy the blessings of a free, pure, and enlightened public press, and that the British people might, by their virtue, courage, and devotion to genuine liberty, prove themselves worthy of so great a blessing.

**Sevenoaks.**—At the third Annual General Meeting of the members of the Literary and Scientific Institution, held on Thursday, January 27th, the Rev. T. Curteis, Vice-President, in the chair, the Secretary read the Report of the Committee for the past year; from which it appears that the total number of members at the end of 1852 was 355, being an increase of 28 on the preceding year. The total number of volumes in the library is 1,246. The receipts during the year were 168*l.* 5*s.* 6*d.*; the expenditure 156*l.* 13*s.* 3*d.*, leaving a balance in the hands of the Treasurer of 11*l.* 12*s.* 3*d.* Great efforts are being made to provide a room or rooms for a museum, and a subscription list has been opened for the purpose of raising the requisite funds before the erection is commenced. Already 42*l.* 10*s.* has been subscribed. Colonel Austen, one of the Vice-Presidents, has offered the land on a lease for twenty-one years at a nominal rent; besides placing a large quantity of building materials at the disposal of the Committee.

**Sudbury.**—On the 8th instant an interesting and instructive Lecture was delivered by W. W. Boreham, Esq., F.R.A.S., of Haverhill, "on some Recent Discoveries in Astronomy," illustrated by diagrams. The lecturer gave some particulars of the recent total eclipses of the sun, as witnessed by eminent astronomers in the north of Europe, the planets discovered during the present century, the variations observed in the planet Saturn, comets and their orbits, distances of the fixed stars, &c., concluding with some remarks on the benefits to be derived from a study of the science of Astronomy.

**Tenterden.**—On Tuesday evening, February 8th, a lecture, in connection with the Mutual Improvement Society, was delivered by the Rev. R. E. B. Maclennan, of Canterbury, "On England One Hundred Years Ago," W. Grisbrook, Esq., President, in the chair. The lecturer drew a forcible picture of the depravity and consequent immorality of that period. After depicting the general insecurity of both person and property at that time, he enlarged somewhat upon the extraordinary advance of the arts and sciences and general improvement of society during the last fifty years. The audience left much pleased, and with no longing for the "Good old times," when sixteen men were hung in a day, and harmless, inoffensive old women were ducked to death for witchcraft. Classes for Music and the French language have just been established.

**Wareham.**—A Lecture was delivered in the Townhall, to the members of the Mutual Improvement Society, on Wednesday evening, the 9th ultimo, by the Rev. G. C. Bellows, of Poole, "on Dreams." Although the subject appears a difficult one for a lecture, the lecturer made it one of great interest, explaining it poetically, metaphysically, and practically, giving authenticated examples of dreams of consolation, revelation, prophecy, &c., and making extracts from different works on the subject.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

A neat Case, for holding the Numbers of the Journal for half a year, is now ready, and may be had of the Publisher, 186, Fleet-street, price 1s. 8d.

## QUESTIONS FROM CORRESPONDENTS.

*White Charcoal.*—A substance was sold some years ago in London by the name of "white charcoal." I had an impression that it was prepared by Hume, the chemist in Long acre; but he being dead, his successor can give me no direct information respecting it. I have also inquired for it from other quarters, but without success. Can you, or any of your correspondents, give me the information here sought, which I am very anxious to have, and to procure a supply of the substance in question? It is, I believe, prepared from bones, but is totally different in appearance and properties from the phosphate of lime of commerce, as also in the effect for which I want it. [No. 35.]

*Musical Instruments.*—Can you refer me to any published work of recent date, which sets forth the true scientific principles involved in the construction of wind instruments? [No. 36.]

*Decomposition of Water.*—Have any results of importance been obtained in reference to the decomposition of water by magnetic electricity, and where can I obtain a published account of the experiments? [No. 37.]

*Artificial Stones.*—Is there any work which sets forward the merits claimed for the various processes of preparing the indurated and other artificial and moulded stones intended for external building purposes? [No. 38.]

*Straw Paper and Papier Maché Board, from Straw.*—At what mills are straw paper and papier mache board being made from straw, and is the machinery the same as in ordinary paper mills? [No. 39.]

*New Patent Law of* 1852.—Who are the parties to apply to for protection or registration, and what would be the expense of the same?—and, 2nd, What would be the cost of a patent for six months, on condition that it might be renewed for a much greater time?—J. C., W. [No. 40.]

J. C. W. is informed, in reply to his queries respecting the Patent Law Amendment Act, 1852, that an inventor desirous of protection under the Act, should leave, at the office of the Commissioners of Patents, Quality-court, Chancery-lane, a petition for a patent, accompanied by what is termed a provisional specification, with a declaration that he is the true and first inventor, and that the same is not in use, and that such provisional specification describes the nature of the invention. If the Law-Officer is satisfied with the provisional specification, he grants a certificate to that effect, which is filed at the Commissioners' Office, and thereupon protection for six months is obtained. The provisional specification shortly describes the nature of the invention. Should the inventor be desirous of proceeding to complete his patent, he gives notice at the Commissioners' Office, and such notice is advertised in the *London Gazette*, and opposing parties may have notice of objection within twenty-one days. If there be no objection, or the objections are overruled, the applicant obtains a patent for fourteen years, on condition of his filing a complete specification within six months from the date of his original application. Such patent, however, ceases at the end of three years and seven years respectively, unless removed by payment of certain fees at such times. Practically, it stands thus,—The six months' protection is obtained on payment of a fee of 5*l.*, the patent for three years on payment of a further fee of 15*l.*, with a stamp duty of 5*l.*; for seven years a payment at the end of the three years of a further fee of 40*l*, and stamp duty of 10*l.*; and for the whole fourteen years, on payment at the end of seven years of a further fee of 80*l.*, with a stamp duty of 20*l.* These fees and duties are irrespective of fees which may have to be paid in the event of opposition, and of payments to a patent agent for transacting the business, if one be employed. The rules governing the practice in passing letters patent may be obtained, *gratis*, on application at the Commissioners' Office. Forms of the petition, declaration, and provisional specification, may be purchased at the law-stationers; but although, no doubt, in some instances an inventor may easily manage the whole matter himself, yet as his future rights will depend on the exact title of his invention, and on many nice points of construction, both of the provisional and subsequent specification, he cannot be advised, as a general rule, to act without the assistance of some respectable and competent patent agent.

It may be added, that an inventor, instead of having a provisional specification, may file at the office, with his petition and declaration, a complete specification at once, and thereupon, without reference to the Law-Officer, the invention is protected for six months, and the inventor gets the same rights during that period as if he had a patent; but if he desires to extend the time by completing his patents, such patent is void, if the previously filed complete specification does not correctly describe the nature of the invention. This provision is entirely a novelty, and has been but little acted upon up to the present time.

*Peat Charcoal.*—Can any reader favour me with an inexpensive process for making this article, without reference to the other products obtained in its manufacture? [No. 41.]

*Copal Varnish.*—Can any of your readers inform me what are the ingredients employed in making copal varnish, and the best mode of making it? [No. 42.]

## ANSWERS TO CORRESPONDENTS.

*Green Walls*, [No. 29].—Has your correspondent tried any of the kyanizing processes? The following extract from a note I once received from the late Professor Cowper will show that the principle is applicable to other articles than timber: "When I first began to lecture upon paper-making I received some pulp from a friend, and having kept what I did not use for eight or ten months, I found it quite mouldy, and so my paper was spotted. I then procured some more, and put a very small quantity of *corrosive sublimate* into it—in fact, I kyanized it; and now I find it keeps perfectly clear of mouldiness for more than a year, and I have no doubt pulp so treated would make paper that would not be liable to mildew."

*Mildew on Walls.*—Your correspondent, No. 29, will find that by washing the wall with a solution of corrosive sublimate, say three ounces to a gallon of water, every six or eight months, the mildew will be preventing forming.

*Book-indexing.*—In my second reply to correspondent "Book-indexing," I think he is in error as to the way the letterings *are done*. The edges of his foreign books, I believe, are done by the bookbinder, as I said they could be in my answer, and not by the letter-press printer. The bookbinder uses single *hand* letters; the printer, a mass, fixed together, and worked off in a *machine*.

## PARLIAMENTARY REPORTS.

The Select Committee of the House of Commons, appointed in December last, to inquire into the expediency of distributing gratis, under certain regulations, a selection from the Reports and Returns of the House of Commons amongst Literary, Scientific, and Mechanics' Institutions, commenced its sittings on Thursday, the 17th of February.

A large number of petitions from various local Institutions, which have been presented to the House, respecting the distribution of these papers, have been referred to the Special Committee, the report of which will, no doubt, be looked for with considerable interest.

The following is a List of the Parliamentary Papers printed and presented to the House since its Christmas recess, in continuation of the Lists given in previous Numbers of the Journal:

### SESSIONAL PRINTED PAPERS OF PARLIAMENT,

*Delivered during the Christmas Vacation.*

Par. No.
22. Western Harbours (Ireland)—Report, &c.
10. Drainage of Lands (Ireland)—Lords' Report.
63. Parliamentary Papers—Return.
69. Chronometers—Copies of Applications, &c.
86. Tuscany—Copy of Address, &c.
89. Loans (Public Works)—Return.
90. Consolidated Annuities (Ireland)—Memorial.
95. Income-tax—Return.
53(1). Trade and Navigation—Accounts.
68. Public Income and Expenditure—Return.
81. Capture of Bruné, &c.—Despatches.
94. Funded and Unfunded Debt—Return.
93. Tewkesbury Union—Communications.
96. Hop Duties—Account.
97. Sugar, &c.—Return.
98. Consolidated Annuities (Ireland)—Memorial.
51. New Churches—Particulars of Information.
88. Ceylon Commission; Ceylon Committee—Account and Return.
82. Arctic Expeditions—Correspondence.
34. Woods and Forests, &c.—Thirtieth Report of Commissioners.
75. Bethlehem Hospital—Return.
84. Customs' Duties (Colonies) Return; Factories—Reports of Inspectors; Cape of Good Hope (Representative Assembly)—Further papers.

SESSION 1852.

515. Criminal and Destitute Juveniles—Report.
395 & 527. Metropolis Water Bills—Index to Minutes of Evidence.

*Delivered on 11th Feb.*, 1853.

National Education in Ireland—Sixteenth Report of Commissioners, Vol. I.

*Delivered on 14th Feb.*

100. Navy Estimates.
National Education in Ireland—Eighteenth Report of Commissioners, Vol. II.
Marriages in Ireland—Third Report of the Registrar-General.

*Delivered on 15th Feb.*

92. Troops (Colonies)—Return.
Greek Succession—Treaty.
Chili (Reciprocal Abrogation of Differential Duties)—Convention.

## PATENT LAW AMENDMENT ACT, 1853.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 11th Feb.*, 1853.

*Dated 14th Dec.*, 1852.

1052. W. Irlam—Improvements in railways.

*Dated 1st Jan.*, 1853.

2. H. Bensley—Vulcanised India-rubber springs for trousers and braces, &c.

*Dated 6th Jan.*

35. E. A. Chameroy—New composition of metals.

*Dated 13th Jan.*

91. C. Bullivant—Improvements in spoons and ladles.

*Dated 25th Jan.*

183. A. F. Remond—Ornamenting glass, &c.
185. W. T. Henley—Covering wires, &c., for telegraphic purposes, &c.
187. F. Simpson—Combining materials for cleansing stone.
189. A. V. Newton—Improvements in manufacture of printing surfaces. (A communication.)
191. R. W. Sievier and R. W. Walthman—Bleaching.
193. J. E. Mayall—Daguerreotype and photographic processes.

*Dated 26th Jan.*

195. J. Davis—Improvements in optical and mathematical instruments.
197. N. F. Ador—Plastic materials.
199. C. Nolet—Improvements in indicating time.
201. J. Combe—Hackling and combing flax, &c.

*Dated 27th Jan.*

203. C. H. Alabaster—Improvements in ploughs.
204. A. B. Sturdee—A twin-stern ship, with protected propeller.
205. E. Brown—Blades of table-knives.
206. J. Murdoch—Stamping or shaping metals.
207. E. J. Biven—Signals on railways, &c.
208. W. and J. Galloway—Steam-engines and boilers.

*Dated 28th Jan.*

210. R. Shaw—Starting, stopping, and reversing steam-engines.
211. J. Learmont—Marine pumps and apparatus.
212. W. Tranter—Improvements in fire-arms.

213. A. Lucas—Improved inkstand.
214. L. C. Koeffler—Bleaching and dyeing.
215. J. Scott—Closing or stoppering bottles, jars, &c.
216. G. E. Donisthorpe and J. Crofts—Combing wool, hair, &c.
217. J. Poli Kingston—Combining metals for bearings, &c.
219. J. Scott Russell—Constructing ships propelled by screw, &c.
220. R. Speed—Communication between guard and driver.
221. R. A. Brooman—Improvements in cables. (A communication.)

*Dated 29th Jan.*

222. H. Avins and G. Tarplee—Improved brick.
223. H. Potter. Method of producing a certain colour on woven fabrics, &c., and in machinery, &c.
224. J. Standish—Machinery for preparing cotton, &c., for spinning.
225. W. Archer—Preventing accidents by signals on railways, part applicable to blast furnaces.
226. H. Moorhouse—Preparing cotton, &c., and in machinery for same.
227. F. Mackrory—Preventing entry of dust, &c., into windows (called *Pulviris depulsor*).
229. F. Whishaw—Improved lock or system of locks.
230. J. R. and J. B. Corry—Dressing lambskin leather.
231. A. B. Brooman—Diving-bells and apparatus. (A communication.)
233. M. Spring—Separating gold. (A communication.)
234. W. H. Hewitson—Suspending mariners' compass in iron vessels.
235. H. Batchelor—Combining metal plates for ship-building, &c.
236. J. Shand—Improvements in ships' fire-engines.
237. S. Rogerson—Manufacture of braid, and machinery for same.
238. L. Jennings—Improved lock.
239. W. Constable—Transmitting motive power to machinery, and regulating rotary steam-engines.
240. W. E. Newton—Machinery for dressing cloth. (A communication.)
241. J. B. Lavanchy—Construction of collapsible framework for portable bedsteads, houses, bridges, &c.

*Dated 31st Jan.*

244. T. Knox—Rotatory heel for boots and shoes.
245. C. Caulfield—Propelling vessels by tubular propellers with pistons.
246. C. Cowper—Preserving butter and other substances.
247. S. Perkes—Construction of works applicable to aqueducts, viaducts, &c.
249. T. M. Jones—Checking or stopping railway-trains and steadying carriages. &c.
251. L. G. Perreaux—Machinery for testing strength of yarn-thread, &c.
252. E. Pugh—Ballasting ships, and rendering them buoyant.
253. J. Mason—Improvements in looms.
254. T. Lightfoot—Glaze for pottery, &c.
256. D. Chalmers—Improvements in looms.
257. J. P. Magoon—Steam-boiler chimneys.
259. M. Pizzie—Railway carriage-break.
260. M. L. A. Tarin—Improved dustpan.
261. M. L. A. Tarin—Reflectors.
262. J. Comins—Clod-crusher.
263. S. Borcham—Improvements in time-keepers.
265. J. Pinkerton—Ornamental glass.
266. G. Stretton—Improvements in soap, called, "Amylon, or starch soap."
267. C. Hadley—Construction of granite and stone pavements.

*Dated 1st Feb.*

269. E. Edwards—Improved bedstead, which may be used as a vehicle.
270. T. C. Clarkson—Improvements in giving elasticity to certain structures.
271. E. Whele—Improvements in candles, and machinery for same.
272. J. Murgatroyd—Construction of boilers.
273. J. Cockerill and T. Barnett—Construction of coffee-roasters.
274. T. Williams, J. Plimpson, and R. Buchanan—Actuating ships' pumps, &c.
275. J. Carter—Rotary engines.
277. W. Levesley—Construction of pencil-cases.

*Dated 2nd Feb.*

278. W. Gregory—Bricks and tiles. (A communication.)
280. A. E. L. Bellford—Manufacture of candles. (A communication.)
283. A. E. L. Bellford—Stoppering apparatus for bottles. (A communication.)
284. J. Smeeton—Dials for telegraphic instruments, &c.
286. O. Williams—Water-closets.
288. R. A. Brooman—Expansion valves. (A communication.)

*Dated 3rd Feb.*

294. G. J. Newberry—Improvements in hinges. (A communication.)
296. B. Dulaurier—Rendering boots and shoes waterproof without sewing or nailing, applicable to hats, &c., and machines for shoemaking and hatting.
298. J. Greenhalgh—Improvements in churns.
300. W. Richards and E. Beck—Machinery for exhausting or driving air.

APPLICATION WITH COMPLETE SPECIFICATION FILED.

338. A. E. L. Bellford—Improvements in metal musical wind instruments, to be called, "Besson's System." Feb. 5, 1853.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 12th Feb.*, 1853.

500. Arnold James Cooley, of Parliament-street—Improvements in the manufacture of artificial leather.
585. John Whitcomb and Richard Smith, of Kidderminster—Improvements in the manufacture of carpets, hearth-rugs, and other similar fabrics.
611. Robert William Siever, of Holloway—Improvements applicable to the manufacture of hats, caps, and bonnets, or other coverings for the head.
698. Oswald Dodd Hedley, of Newcastle-upon-Tyne—Improvements in getting coals and other minerals.
944. Page Dewing Woodcock, of Lincoln—Improved preparation or pill for medicinal purposes, hereby denominated, "Page Woodcock's Wind-pills."
1003. Sir John Powlett Orde, Bart., of Kilmorey House, Loch Gilp Head, Argyle—Improvements in head-gear for horses, and other like animals.
1063. George Elliott and William Russell, of St. Helens, Lancashire—Improvements in boiling down saline solutions.
1132. Frank Clarke Hills, of Deptford—Improvements in purifying gas.
1150. Peter Fairbairn, of Leeds, and Samuel Renny Mathers, of Leeds—Improvements in mechinery for carding flax, hemp, China-grass, and jute, and the tow of the several materials before mentioned.
1152. Fulcran Peyre and Michel Dolques, of Lodéve, Department of L'Herault, in France—Improvements in machinery for dressing woollen cloth.

*Sealed 14th Feb.*

1107. William East, of Spalding—Improvements in machinery for crushing clods, for dibbling and drilling land, and sowing seeds.

*Sealed 16th Feb.*

155. David Stephens Brown, of 2, Alexandrian Lodge, Old Kent-road—Improved means of navigating the water by ships.
387. Joseph Major, of 13, Elizabeth-place, Ball's-pond-road, near Kingsland-gate—Removing spavins, ringbones, curbs, splents, and other unnatural ossifications and humours from horses.
430. Richard Archibald Brooman, of 166, Fleet-street—Improvements in vices.
525. Myer Myers and Maurice Myers, of Birmingham—Improvements in pens and penholders.
839. James Higgin, of Manchester—Improvements in the manufacture of certain mordants used in preparing woven or textile fabrics for printing, straining or dyeing them, and in the mode or method of using the same or other mordants for the said purposes.
970. Asa Lees, of Rhodes House, within Oldham, and Thomas Kay, of Mumps, within Oldham—Improvements in machinery for spinning and doubling cotton, wool, silk, flax, and other fibrous materials.
1071. Thomas Dunn, of Pendleton, Hugh Greaves, of Manchester, and William Watts, jun., of Miles Platting, near Manchester—Improvements in machinery and apparatus for altering the position of engines and carriages on railways.
1161. George Bower, of St. Neot's—Improvements in the manufacture of gas for illumination.
1185. Francis Alton Calvert, of Manchester—A universal ratchet-drill.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Feb. 10 | 3420 | Portable Gas Apparatus. | Benjamin Sawdon | Huddersfield. |
| „ „ | 3421 | The Club-house Cravat. | Dent, Allcroft, & Co. | 97, Wood-street. |
| „ 11 | 3422 | Improved Self-adjusting Tongs, or Claws, used for Gas-piping Shafting or other similar purposes. | Christopher Hodgson and James Stead | Salford, near Manchester. |

# SOCIETY OF ARTS.

FRIDAY, FEBRUARY 25th, 1853.

## ELEVENTH ORDINARY MEETING,

*Wednesday, February 23rd,* 1853.

The Eleventh Ordinary Meeting of the Society was held on Wednesday, the 23rd inst.; Major-General Sir Charles William Pasley, K.C.B., Vice-President, in the Chair.

The following were elected Members:

Buckmaster, J. C. Battersea.
Carthew, Peter, St. Mary Abbot's-terrace, Kensington.
Clemow, Frank, 162, Fleet-street.
Dykes, David Stewart, Deptford Pier.
Passea, George, 3, Adelaide-place, London-bridge.
Jones, Jenkin, 1, Camden-square, Camden-town.
Rigg, Rev. Arthur, Chester.
Wilson, James, 128, Fitzwilliam-street, Sheffield.

and the names of eight candidates for membership were read.

A paper on Uniform Weights, Measures, and Moneys, by Professor Jack, of King's College, Fredericton, New Brunswick, was read. After a brief sketch of the history of the weights and measures used in different countries generally, but more especially in England, the Author pointed out the arbitrary and uncertain nature of the original standards. He stated that:

It was not till the beginning of the eighteenth century that philosophers became fully alive to the necessity of having the standards of weights and measures determined with the greatest accuracy and precision, in order that much of the knowledge, which time and observation had accumulated, might be available to posterity. In the year 1742, some Fellows of the Royal Society of London, on the one hand, and Members of the Royal Academy of Sciences at Paris, on the other, thinking it might be of good use for the better comparing the results of scientific experiments made in England and France, proposed that accurate standards of the weights and measures of both nations, having been constructed and carefully compared, should be deposited in the archives of each of the Societies. On investigation, the Committee of the Royal Society entrusted with the matter, found, besides the legal standard yard at the Exchequer, several others which were considered of almost equal authority. Of these, they selected the one kept in the Tower of London, as being the best defined, and therefore the best adapted to their purpose; and requested Graham, the celebrated clockmaker, to lay off from it the length of the yard on two brass rods. These were both sent to the Academy of Sciences; and the measure of the half toise having been laid down on each of them, one was kept at Paris, and the other —which was destined to play an important part, inasmuch as it served as the foundation from which our present standard measure was derived —was returned to the Royal Society, with whom it still remains.

In the year 1758, the House of Commons was induced to appoint a Committee to inquire into the original standards of weights and measures in the kingdom, and to examine the standards kept at the Exchequer, the Guildhall, and other places. This Committee presented to the House a very elaborate and valuable report; in which they recommended that a rod, which had been made at their order by Mr. Bird, from that of the Royal Society, should be declared the legal standard by which all measures of length were to be adjusted. A Committee formed in the following year concurred in the above recommendation, and at their suggestion Bird was employed to take a copy, or duplicate of what was intended to serve as the standard yard, in case of the latter being lost or injured. These were intrusted to the custody of the clerk of the House of Commons, and were called Bird's Parliamentary Standards of 1758 and 1760. Both reports were agreed to by the House, and a Bill framed in conformity with them was introduced, but for some reason or other it was never carried through; and although several attempts were subsequently made, no legislative enactment was passed, until 1824, "when, for the first time, a formal definition was given of our unit of measure; and that in the following terms. The straight line, or distance, between the centres of the two points in the gold studs in the brass rods, now in the custody of the clerk of the House of Commons, whereon the words and figures, *Standard Yard*, 1760, are engraved, shall be, and the same is hereby declared to be, the original and genuine standard of that measure of length or lineal extension called a yard; and that the straight line or distance, between the centres of the two points in the said gold studs in the said brass rod, the brass being at the temperature of 62° of Fahrenheit's thermometer, shall be, and is hereby denominated, the *Imperial Standard Yard*, and shall be, and is hereby declared to be the unit or only standard measure of extension." The adoption of Bird's rod as the standard has been severely and justly censured; for besides being a copy three degrees removed from the original in the Tower, which was itself never recognized as a legal standard, it seems to have been constructed with much less nicety than might have been expected. It, along with other standards, was destroyed by the fire which consumed the two Houses of Parliament, in 1834; and as yet, the steps by which, according to the Act of Parliament, they "*shall, and may be restored,*" in case of such a casualty have never been taken.

It will now be necessary to turn back a little to examine what were the proposed methods of restoration, and this leads to the second branch of the subject.

It is obvious that as the essential imperfection of language renders it impossible to convey by written law or oral tradition, any definite notion of the magnitude of a line without reference to some other line of known length, the chances of being able to replace a lost standard by another, which shall differ from it in length by a quantity so small as to satisfy the requirements of modern science, must depend either on the multiplication and careful preservation of exact copies of the original, or on the precision with which its relation to some determinate and invariable standard in nature, can be ascertained and afterwards recovered. At first view, the last method seems the best, as it is undoubtedly the most philosophical; and to it, accordingly, the Legislature of Great Britain gave the preference. But however desirable it may be, that our measure of length should be derived from something that cannot be altered by man, either from design or accident, it unfortunately happens that such a natural unit is not so readily found as might be imagined: in fact, none can be obtained without the aid of profound science, and a refined knowledge of the Arts. Laplace observes, "that the length of the pendulum, and that of the meridian, are the two principal measures which nature offers to fix the unity of linear magnitude. As both are independent of moral revolutions, neither can experience a sensible alteration, but by great changes in the physical condition of the earth."

The author then proceeded to describe the steps taken in France to obtain fixed and unchangeable standards of Weights and Measures, quoting at some length the important Report of the French Institute of 1798; and the similar attempts made by Great Britain, especially the well-known Commission appointed by Government, in 1818, for the purpose of forming new standards of Weights and Measures, or of determining the relations of those already in use to some unchangeable standard existing in nature. Both these attempts, he showed, had been altogether unsuccessful.

The trial made in France to procure a *fixed* standard directly from nature, and that made in England to determine the relation of one already in use to an invariable unit from the same source, having proved equally humiliating and futile, the Commissioners appointed in 1838, to consider the steps necessary to be taken for the restoration of the Standards of Weights and Measures, very properly recommended in their Report to the two Houses of Parliament, in 1841, the total disuse of all attempts to procure a natural standard, and the return to the old plan of standards manufactured in metal. They also advised that four copies of the best existing representations of the old standards should be made and carefully compared, and that one of these copies should be hermetically sealed, and imbedded in the masonry of some public building, marked by an inscription, and only to be opened by Act of Parliament; and that various precautions, minutely named, be taken for the preservation and safe custody of the others.

Before entering upon the third and last branch of the subject, it would not be unprofitable to consider what are the chief desiderata in a good system of weights and measures, and how far it would be possible to secure them for a system already in operation in a great country. On these points, however, the principle according to which the suggestions for the changes afterwards proposed are made, will simply be indicated.

In the first place, then, it is highly desirable that simple, rapid, and uniform methods of calculation be obtained; and that their results be capable of being exhibited with clearness and precision. For these purposes it is admitted, on all hands, that the decimal scale is preferable to every other, inasmuch as it would reduce all numerical computations to the operations comprehended in the four common rules of arithmetic. Under such a system of weights and measures, therefore, a child would be able to learn everything necessary for entering upon the ordinary concerns of the world in one month, as well, if not better than he could do in twelve, under the present complicated and puzzling system.

In the second place, the primary units of an existing metrical system, more especially those used in the ordinary transactions of trade and commerce, ought, on no account, to be altered: and even in the multiples and subdivisions of these units no changes ought to be attempted, but such as, when assisted by a general sense of their manifest advantages, the authority of the Government could enforce the adoption of.

Taking these principles as a guide, the ordinary Tables of Weights and Measures can now be examined in detail; and as money is directly or indirectly the basis of all kinds of traffic, and therefore an essential element in all calculations connected therewith, it will be well to begin with the Table relating to it.

In the Money Table, the division of the pound into 960 farthings, and the supremacy of the Government in all matters relating to the coinage, happily facilitate the adoption of the decimal scale; and it is stated in the Report of the Commissioners, made in 1841, that no circumstance would contribute so much to the introduction of such a scale in the weights and measures generally, as the establishment of a decimal coinage. For this purpose there would be needed the following new coins:

1. A silver coin of the value of two shillings, which might be called a *Decine or Victorine*,—the latter name having been proposed by the Commissioners.

2. A silver, copper, or mixed coin, of the value of 2 $\frac{2}{5}$ pence, which might be called a *centine*.

3. A copper coin of the value of $\frac{960}{1000}$ or $\frac{24}{25}$ of a farthing, which might be called a *milline*.

With respect to other subdivisions of the pound, the half sovereign, and the crown would be retained, as being in accordance with the binary system, which, to a certain extent, has always been found most convenient in the retail trade; for the same reason the shilling and sixpence might remain as the half and quarter of the *decine*,—though it would perhaps be better that the latter should be withdrawn on account of the name and replaced by a silver coin of the value of 2 *centines* (=4 $\frac{4}{5}$ pence):—the farthing and the penny being nearly equal in value to the *milline* and the half *centine*, might continue to circulate for them, until new copper coins of the value of 1, 2, and 4 *millines*, respectively, could be issued. A copper or mixed coin of the value of 5 *millines* would also be found useful, and would probably render the issuing of the 1 *milline* coin unnecessary.

It might, at first view, be supposed that in this province (New Brunswick), on account of the coins being of different nominal values, no advantage would be derived from the introduction of such a system in Great Britain; but this is not the case, for a relation having been once established between the Pound currency and the Pound sterling (at present their relative values are as 1 to 1.217 nearly), the same relation expressed by the very same figures would subsist between their decimal sub-multiples. Sterling money would therefore be more easily converted into currency, or *vice versâ*, than at present; and in all internal transactions the full advantages of the decimal scale, in so far as relates to the coinage, would be enjoyed by that Province. These advantages all the business-men in the North American Colonies, will be ready to appreciate from their familiarity with the decimal system of their Republican neighbours.

Were the proposed change effected, the Money Table would stand as follows:

| Millines. | Centines. | Decines. | Pound. |
|---|---|---|---|
| 10 | 1 | | |
| 100 | 10 | 1 | |
| 1,000 | 100 | 10 | 1 |

On turning to the Tables of Weights, in addition to the lamentable irregularity according to which the division proceeds, whereby it is rendered so burdensome to the memory, a source of confusion, perplexity, and fraud is discovered in having the same names attached to weights of different magnitudes. Thus, the Troy pound is less than the Avoirdupois in the ratio of 144 to 175; but the Troy ounce is greater than the Avoirdupois in the ratio of 480 to 437½; the drachm in Apothecaries weight is 60 grains, while the drachm Avoirdupois is only 27$\frac{11}{32}$ grains. With a view, in some measure, to remedy these serious and glaring defects, the Report of 1841 recommends that the use of the Troy weight be declared illegal, except for transactions in gold, silver, and precious stones; and that the Avoirdupois pound be adopted as the standard weight of the kingdom. To procure, as far as was thought possible, the benefits of the decimal scale, it also recommended the suppression of the stone and hundred-weight, and the substitution for them of weights of 10 pounds and 100 pounds respectively. It will now be shown, that without overstraining the principles already laid down, it is quite possible to go a little further. The Troy weight is used chiefly at the Mint, and by jewellers, physicians, and apothecaries; and the most important unit in it, and the one most frequently referred to, is the grain. The Government having supreme control over its own officers, could easily direct all weights taken at the Mint to be expressed in grains; and jewellers, physicians, and apothecaries, forming an intelligent portion of the community, would have no difficulty in reducing the different weights employed by them to the same denomination. Indeed, they ought not to grumble at being even compelled to perform this small amount of mental labour for the sake of general convenience. Moreover, it would better become the boasted enlightenment of the day to have physicians' prescriptions made out simply in grains, than to see them covered with the mystical symbols—remnants of the dark ages—which now adorn them. In Troy weight, therefore, it seems that the grain, or some simple aliquot part of it, from which it could be readily deduced, is all that it is in any way necessary to encumber our Tables with.

By far the most important unit in Avoirdupois weight is the pound. Now, it is well known that reference is much more frequently made to its half and quarter than to the corresponding number of ounces—and further, that the subdivisions of the ounce are seldom, if ever, used in practice, and accordingly few people have more than a confused recollection of them. In Great Britain, the stone of 14 pounds is a legal weight, and is employed for many purposes; but it has not found its way into this province (New Brunswick.) It thus appears, that in the weight now under consideration, the pound must remain intact, but that the lower denominations are of very little consequence. If the same submultiple of the pound that the pound is of the stone be taken, and then divided decimally, a weight equal to half a grain will be arrived at; and thus it will be possible to preserve and connect together in one Table all that is most valuable in both Troy and Avoirdupois weight, and also at the same time introduce in a great degree the decimal scale. The following Table will show more clearly how those objects may be attained:

| Grains. | Millozes. | Centozes. | Decozes. | Ozes. | Pounds. | Stones. | Decones. | Hectones. | Kilone. |
|---|---|---|---|---|---|---|---|---|---|
| 5 | 10 | 1 | | | | | | | |
| 50 | 100 | 10 | 1 | | | | | | |
| 500 | 1,000 | 100 | 10 | 1 | | | | | |
| 7,000 | 14,000 | 1,400 | 140 | 14 | 1 | | | | |
| 98,000 | 196,000 | 19,600 | 1,960 | 196 | 14 | 1 | | | |
| | | | 19,600 | 1,960 | 140 | 10 | 1 | | |
| | | | | 19,600 | 1,400 | 100 | 10 | 1 | |
| | | | | | 14,000 | 1,000 | 100 | 10 | 1 |

The fourteenth part of the pound might receive a new name, but it would probably facilitate its adoption to call it the *Imperial ounce*, and to distinguish it in writing as shown in the Table. The present weights of 8 ounces and 4 ounces might continue for a time in circulation as the half and quarter pound, but it ought to be observed that their values in the new denomination would be only 7 ozes and 3½ ozes respectively. The remaining submultiples of the pound would require to be withdrawn, and replaced by such others of the new denominations as might be thought necessary. The 2 ozes weight would be particularly useful for scientific purposes, since it would contain exactly 1,000 grains.

It will be perceived that the above Table deviates from the decimal scale only in the middle, where 14 is a common multiple of the oze and of the pound. It therefore possesses a certain regularity, which would insure its being easily remembered. In the ordinary concerns of every-day life, the pound would serve as the superior unit, which would probably, after the advantages of the decimal division had been fully felt and developed, be in a great measure superseded by the oze. For the heavier transactions of business, the stone and its decimal multiples would be employed. In the suppression of the hundred-weight, nothing more is done than was recommended by the Commissioners of 1838; and the use of the ton in matters of shipping, where it is taken in the sense of a measure of capacity, and not as a weight, could not be urged as a reason against removing it from the Table of Weights. The facility with which, when required, the old weights could be reduced to the new, or *vice versâ*, will be apparent from the following considerations. *Millozes* are obtained by simply doubling the number of grains, and the higher divisions up to the oze, are just ten times the lower. The imperial ounce is heavier than the avoirdupois by just $\frac{1}{7}$, and than the troy by $\frac{1}{24}$; the *Decone* is $\frac{1}{4}$ heavier than the present cwt.; the *Hectone* is equivalent to $\frac{5}{8}$ of the ton; and the *Kilone* is 6¼ ($\frac{100}{16}$) tons, or 125 cwt.

The standard pound Troy, by which all other weights were to be regulated, was destroyed with the standard Yard, by the fire that consumed both Houses of Parliament in 1834. In scientific theory it was supposed to be deduced from the standard for lineal extension, and in this respect to originate with the grain, which was to be of such magnitude that 252·458 grains, in brass, would just be in equilibrium with a cubic inch of distilled water, when the mercury stands at 30 inches in a barometer, and in Fahrenheit's thermometer at 62 degrees, both for the air and for the water. The impossibility of reproducing it according to this principle, which was nevertheless prescribed in the Imperial Act of 1824, has already been pointed out.

The extreme inconvenience and absurdity of the "fluid measure" used by Apothecaries, was next pointed out; and the following modified Table suggested as a more practical and convenient system of admeasurement:

| Minims. | | Millims. | | Centims. | | Decims. | | Pints. | | Quarts. | | Gallons. | | Pecks. | | Bushel. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | = | 1 | | | | | | | | | | | | | | |
| 100 | = | 10 | = | 1 | | | | | | | | | | | | |
| 1,000 | = | 100 | = | 10 | = | 1 | | | | | | | | | | |
| 10,000 | = | 1,000 | = | 100 | = | 10 | = | 1 | | | | | | | | |
| 20,000 | = | 2,000 | = | 200 | = | 20 | = | 2 | = | 1 | | | | | | |
| | | | | 800 | = | 80 | = | 8 | = | 4 | = | 1 | | | | |
| | | | | 1,600 | = | 160 | = | 16 | = | 8 | = | 2 | = | 1 | | |
| | | | | 6,400 | = | 640 | = | 64 | = | 32 | = | 8 | = | 4 | = | 1 |

In the Table of Long Measure, the yard and foot are units in such constant use, and have become so intimately associated with our ideas of lineal extension, and are besides of a length so convenient for the purposes to which they are severally applied, that any attempt to suppress either the one or the other would justly be regarded as little short of madness. The different multiples and submultiples of these are obtained in the most irregular manner; but all of them being more or less in common use, and to some extent connected with the records of knowledge, none of them could be withdrawn without occasioning considerable disturbance in national habits. The Commissioners, therefore, in their Report made in 1841, have not thought it advisable to urge any fundamental change in this part of the metrical system, but have contented themselves with strongly recommending the recognition of a new measure of 1,000 yards, to be called a *Milyard*, in all bills relating to railways, roads, and canals, and in the collection of duties upon them. On looking at the matter in a practical light, it may fairly be doubted whether the Commissioners have chosen the proper starting point. It is well known that surveyors and engineers employ neither the yard nor the inch, but work by the foot, and its decimal divisions. They have also brought into very general use ten-feet measuring staves, which are invariably graduated after the same manner. Moreover, in foot-rules and scales, the decimal now generally accompanies the duodecimal divisions; and in philosophical instruments, and in the records of scientific experiments, the former has now almost entirely superseded the latter. Hence, it appears that, taking the foot as the basis, considerable advances have been made towards the adoption of a decimal scale; but no steps have been taken in the same direction from the yard. These beginnings might probably be extended, as shown in the following Table; which, however, is proposed with no little diffidence:

| Millot. | | Centot. | | Decot. | | Foot. | | Dekeet. | | Hecteet. | | Kileet. | | Myreet. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | = | 1 | | | | | | | | | | | | |
| 100 | = | 10 | = | 1 | | | | | | | | | | |
| 1,000 | = | 100 | = | 10 | = | 1 | | | | | | | | |
| 10,000 | = | 1,000 | = | 100 | = | 10 | = | 1 | | | | | | |
| | | | | | | 100 | = | 10 | = | 1 | | | | |
| | | | | | | 1,000 | = | 100 | = | 10 | = | 1 | | |
| | | | | | | 10,000 | = | 1,000 | = | 100 | = | 10 | = | 1 |

The *Myreet*, which wants about $\frac{1}{18}$ of being equal to two miles, would be a very convenient measure for the purposes specified by the Commissioners, and could not fail to recommend itself to engineers. In the foregoing Table it will be perceived that the yard finds no place; but the omission is of little consequence, as its relation to the foot could always be stated separately, and the business of daily life is not likely to allow it to be forgotten. It would, in fact, be retained as a measure apart from the regular system, and continued to be used, though perhaps, after a time, for fewer purposes than at present.

Whatever tends to simplify the measures of length, will also to the same extent simplify such measures of surface and solidity as flow immediately from them. But the Table for the measurement of land, and that for the determination of capacity, are not formed by merely squaring and cubing the measures of length. In the former, as is well-known, a peculiar unit, called the *Chain*, is used. This was invented by Gunter, and consists of one hundred *links*, each of which is of such a length as to secure the advantages of the decimal scale in finding the area in acres. It is remarkable that this is the only example furnished by the Tables of the employment of the decimal division; and the fact of its having been proposed by an individual of no high repute or influence, and continuing for upwards of a century to be exclusively used in the manner he suggested, strongly illustrates the great practical convenience that would result from the general introduction of such a scale. Land measure would be further simplified by stopping short of the final reduction into roods and perches. The hundreth part of the acre might be denominated a *centare*, and the thousandth a *millare*.

As has already been observed, the diversity subsisting between the measures of dry and liquid capacity was not remedied till 1826, when the Imperial Gallon was adopted as the standard unit for all. In New Brunswick, the distinction is still allowed to exist, and the evil is further aggravated by a partial use of the imperial measures. In the internal trade of the province, the old wine-gallon is used for liquids of all kinds—ale and beer not excepted; our retail dealers, no doubt, perceiving that it would be less profitable to sell these by the larger measure that lawfully belonged to them: but the duties at the Custom-house are levied according to the imperial gallon. Our legal standard of dry capacity is the Winchester bushel of 2,150 cubic inches; but there is reason to believe that the imperial bushel of 2,218 cubic inches has been unwittingly introduced into some localities, under the supposition that every measure called a bushel must necessarily be of the same size. The highly objectionable practice of selling by heaped measure, which was very properly abolished in Great Britain by the Act of 5 and 6 Will. IV., c. 63 (1834) is still tolerated. The uncertainty attending such a method of measurement is well exemplified by the fact, familiar to many persons, that a boat-load of coals of fifty chaldrons from St. John will run, when re-measured at Fredericton, fifty-three or fifty-four chaldrons.

Our measures of capacity, therefore, stand very much in need of reform. For the sake of obtaining uniformity, not only with the mother-country, but also throughout the province itself, the imperial measures should be declared the only standards of both liquid and dry capacity; and selling by heaped measure ought to be utterly suppressed. It would also conduce to greater accuracy, and afford less opportunity for fraud, if all dry goods that are now sold either by heaped or stricken measure, were ordered to be sold by weight. Coals ought, most undoubtedly, to be weighed; and this could be done (as is the case with hay, at the common weigh-scales) at a less expense than they are at present measured. It would, likewise, be fairer to both buyer and seller to have grain and roots of all kinds taken by weight, and the bargain made at so much per pound, or per hundred pounds.

Owing to the Table of the measures of capacity being framed in almost perfect accordance with the binary scale,—which, as has already been remarked, seems the best adapted to the purposes of the retail trade,—it would be impolitic, and, perhaps, useless, to try to effect a change in the mode of subdivision; more especially as the lower units are readily convertible into decimal parts of the higher.

The introduction of the Imperial Gallon into Great Britain created considerable embarrassment in many departments of trade and commerce, and was, at the time, productive of a good deal of confusion and discontent. It was recommended solely on the ground that it would contain exactly 10 pounds avoirdupois of distilled water, at the temperature of 62° Fahrenheit, the mercury in the barometer standing at 30 inches; and would thus afford an easy method of verifying the accuracy of the gallon and its multiples and submultiples by the simple and expeditious process of weighing. On this account merely, a new measure, differing materially from every one of those that had long been in use, was adopted by the two Houses of Parliament. The only real benefit it conferred was the obliteration of the distinction between the measures of dry and liquid capacity, by making them all proceed from the same basis; and this could have been accomplished equally well by enforcing the uniform use of one of the old gallons. The alteration, however, having once been effected, it would be inexpedient and unwise to attempt to undo it.

Angular magnitude, unlike those we have been hitherto considering, has a natural unit of measure. The size of an angle depends on the difference of direction of its two containing sides. But there is a limit to this difference of direction: for, if we suppose one side of an angle to be moveable, and the other fixed, and the former to set out from coincidence with the latter, and revolve round its extremity, so as to make a continually increasing angle, it will, after performing a complete revolution, arrive at the same position which it occupied at first. A whole revolution, then, is the limit to the change of direction, and is a determinate unit which cannot be misunderstood. This unit may be subdivided in any way which is thought most convenient. In nearly all ages and countries the first subdivision has been into 360 equal parts, called degrees. The French philosophers, however, at the end of the last century, wishing to carry out their plan of a decimal scale in all things, resolved that the number should be 400, in order that the quadrant might contain 100 instead of 90 parts. But the ancient nonagesimal degree—a magnitude which had long enjoyed all the advantages of universality—could not be abandoned without needlessly disturbing old associations, and rendering it necessary to recalculate a great portion of our astronomical and logarithmic tables and formulæ. The proposed alteration has not, therefore, been brought about even in France: but had it been confined to the centesimal division of the lower denominations, there is little doubt but that, after a time, it would have been generally adopted as the sexagesimal division of the degree, and its submultiples is acknowledged by all men of science to be the most inconvenient of all the vestiges of ancient astronomy.

For the measurement of Time we have also a natural and determinate unit, namely, that portion of infinite duration which is called a day; and any attempt to divide this otherwise than into twenty-four hours, would be useless and absurd. The centesimal division of the hour would, however, tend greatly to simplify all calculations relating to time; but, for reasons quite obvious to every one, such an alteration would be very difficult to accomplish.

In conclusion, it may be remarked, that the Tables suggested may appear, in consequence of the decimal scale having been strictly adhered to throughout, more cumbersome than they need be in reality; for, on this side of the Atlantic it is found from experience, that there is a natural tendency to the centesimal scale, which would have the effect of reducing the denominations to half the number proposed. It will also be seen, from a comparison of the different Tables, that such uniformity in the system of nomenclature has been observed, that whenever a denomination is mentioned, its relation to its primary unit, and the unit itself, is at once suggested. The proposal of the Commissioners of 1838, that Great Britain should provide one set of itinerant standards for transmission from colony to colony, and that the same should be returned periodically to England, for the purpose of re-verification, seems well worthy of consideration; as by these, the standard measures in every section of her colonial empire could from time to time be adjusted, and thus perfect uniformity with one another, and with the originals, have been secured.

Dr. Booth, F.R.S. said, the first objection to the system just explained was the use of a new nomenclature, which, however scientific, would not meet with general acceptance. They might alter institutions, customs, manners, and even the religion of a country, but not its language. It was a most hopeless task to attempt to make a people change the names of familiar things. Another objection to the proposed system was, that the decimal system was not carried out perfectly; it was introduced only in part. Now, taken by itself, the popular system was much better. for persons in a low state of civilisation, who did not keep written accounts; for nothing could be simpler than to divide into halves, quarters, eighths, and sixteenths. Another better system than the decimal was the duodecimal; for it admitted of four divisors—2, 4, 6, and 3; while the decimal only admitted of two divisors, 2 and 5; but the duodecimal, though good in theory, it would be hopeless to attempt to carry out at present. With our system of notation the decimal system was, he thought, the best for simplicity and readiness in performing arithmetical operations; and his objection to the system just proposed was, that it only carried out the decimal system partially, and in some parts introduced another system. He then laid before the meeting a complete decimal system, agreeing, as far as possible, with the present standards, and with but little change in names. He then proceeded to amplify and explain the system, which is set forth in the following table:

MONEY:

1000 Cents = 100 Tenths = 10 FLORINS = 1 SOVEREIGN.

WEIGHT:

1000 Scruples = 100 Drachms = 10 Ounces = ONE POUND $= \frac{\text{Stone}}{10} = \frac{\text{Cwt.}}{100} = \frac{\text{Hf.-Ton}}{1000}$

One Scruple = 7 Grains.

CAPACITY:

100 Gills = 10 Pints = ONE GALLON $= \frac{\text{Cask}}{10} = \frac{\text{Pipe}}{100}$

5 Wine-bottles = One Gallon.

LINEAR MEASURE:

One Crown Inch, or Dece = 7·92 Inches.
One Crown Foot, or Link = 79·2 Inches.
One Fathom = 79·2 Inches = 6·6 Feet.
10 Fathoms = ONE CHAIN = 22 Yards.
100 Fathoms = 10 Chains = One Furlong.
1000 Fathoms = 100 Chains = 10 Furlongs = One Mile.
One Crown Yard = Half a Fathom = 39·6 Inches.

The crown yard differs from the length of the seconds' pendulum by less than half an inch.

SUPERFICIAL MEASURE:

One Square Fathom = 43·56 Square Feet.
10 Square Fathoms = One Pole.
100 Square Fathoms = Ten Poles = One Square Chain.
1000 Square Fathoms = 100 Poles = 10 SQUARE CHAINS = ONE ACRE.
1,000,000 Fathoms = 1000 Acres = One Square Mile.

The measures in capitals are those at present in use.

In enforcing and illustrating the advantages of this system in its varied details, Dr. Booth remarked, that in regard to land measure, the land chain must remain the standard, or otherwise most inextricable confusion would ensue. In articles sold by ounces or gallons, when the transaction was over there was an end of the matter; but in regard to land, it was a more stable and permanent affair; and all the land in the country having been divided and plotted by means of the chain, it would be impossible to alter it. Another remark he wished to make was, that a reform of this kind was not one that could be introduced bit by bit; to make any alteration without making all, would bring about most intolerable confusion. In making the change, therefore, they must have all or none.

Mr. W. Brown, M.P., would read a letter, which he had addressed to the Board of Inland Revenue on the subject of decimalising the coinage. It was a subject of great importance, especially at the present juncture, when so many of the mercantile population were emigrating. The present system was full of inconvenience—it doubled the labour of clerks, and increased the chances of mistake: any labour-saving element was therefore of moment. He then read the following letter:—

Liverpool.

Dear Sir,—I have cast my eye over Colonel Pasley's work of 1834, on the subject of Coins, Weights, and Measures, and also over Mr. Henry Taylor's "Simple Arithmetic," published in 1847, and the "Companion to the British Almanac of 1841," (Part 1.,) and it is impossible to read what they state without being struck with the advantages that would arise to all parties keeping books, and to the teaching in schools, from decimal arrangements instead of our present confused system. I should be glad of your able assistance in bringing the whole subject of Coinage, Weights, and Measures, under the consideration of the Chancellor of the Exchequer. I see from Mr. Taylor's work that a new Act of Parliament would not be necessary to regulate and decimalise our Coinage, which is the entering wedge to bringing the Weights and Measures into a harmonious decimal system throughout the kingdom. If the Government will bring forward an Act of Parliament to carry out these views with respect to Weights and Measures, to be put in force by an order in Council at some future period, all new school-books for teaching the use of figures would, as a matter of necessity, embrace the new arrangement, and the rising generation would be made familiar with it.

So far as the coinage goes, it appears to me to be a very simple matter. Let us glance at what the United States have done without any difficulty. The New England States and Virginia called the pound sterling 1*l*. 6*s*. 8*d*.; New York and North Carolina, 1*l*. 15*s*. 6½*d*.; the Middle States, 1*l*. 13*s*. 4*d*.; South Carolina and Georgia, 1*l*. 0*s*. 8½*d*.; and the Spanish dollar, taking the States in the same order, was called 6*s*., 8*s*., 7*s*. 6*d*., and 4*s*. 8*d*., and their accounts were kept in £. *s*. *d*. You know they are now simply dollars and cents, 100 cents making a dollar. Their present coinage is the gold eagle, 10 dollars; half-eagle, 5 dollars; the dollar, half-dollar, and quarter-dollar, and 10 or 5 cent pieces. The 12 and

6¼ cent pieces are, I believe, still in circulation; but they create no difficulty, and the fraction in the 6¼ cent piece is sunk.

The only alteration in our Coinage would be in the penny, and the most ignorant person would at once see that the shilling (if they still choose to call it so), under the new arrangement would be fifty farthings, and the present sixpence equal to twenty-five farthings. A farthing implies four parts; a pound did imply a pound in weight, and was originally so, but as it now stands, we perfectly understand it, and would equally well understand that a penny was five farthings.

The alteration proposed, then, is to make our present 96 farthings, contained in 2*s*., into 100. Thus, in a trifling degree decreasing the value of the present farthing, our Money Table would stand:

| | | | | | |
|---|---|---|---|---|---|
| £1 | = | ........................................ | | 1000 | Farthings. |
| 5 Alberts | = | half a sovereign...... | = | 500 | ,, |
| 1 Albert | = | 2*s*. ........................ | = | 100 | ,, |
| ½ ,, | = | 1*s*. ........................ | = | 50 | ,, |
| ¼ ,, | = | 6*d*. ........................ | = | 25 | ,, |
| 1 Penny | = | ............................ | = | 5 | ,, |

I do not see any practical difficulty in calling the present penny five farthings, it being understood that Government, when they called it in, would give a copper coin of the value of five farthings for it. All new coins to be issued ought to have the number of farthings stamped on the back from the "Albert" down. By this arrangement, I cannot see that injury would arise to any one.

I think it of great importance to retain familiar names, where the coins are or approximate the same value so nearly as a new copper coin would that now in use. Tythings, cents, and dimes, would not convey to an English ear the value of the coin half so readily as the "Albert" or florin, and the farthing.

The 2*s*.-piece and the "Albert" would instantly convey the idea of their being the same value. The farthing would have so small a per centage difference, that in retail dealings it would scarcely be taken into account. It would not alter the ruling of our books,—pounds, Alberts, and farthings, would stand in the place of £. *s*. *d*. Thus, 1*l*. 19*s*. 11¾*d*. would be written 1*l*. 9a. 99f. (four figures instead of seven.) It is really not creditable to us, the most commercial people in the world, to have such an unnecessarily complicated system in our Accounts, Weights, and Measures.

I would make it imperative, that after a certain period, no suit could be maintained in a court of justice unless the accounts were kept in £. A. Fgs.

This decimalising of our coinage would not affect your revenue at all, and greatly simplify the mode of keeping your accounts. If you can induce the Government seriously to contemplate and complete such a change, it would prove most beneficial to the nation.

Yours very truly,

WILLIAM BROWN.

John Wood, Esq., Inland Revenue Board.

Mr. BROWN had recently brought the subject before the Liverpool Chamber of Commerce; and as many of the members were deeply anxious for some plan of simplifying monetary transactions, they appointed a Sub-committee to examine and report upon the subject. Another gentleman and himself took the leading part in the Committee; and he would read from the Report, which was in favour of a Decimal System, this other gentleman's views. He proposed to retain "The present Sovereign as the Integer of account, substituting for the Shilling the new Florin, just issued, as a tenth part; and using the Farthing instead of Pence, making that coin, to be termed more correctly in future 'Cents,' current as 100 to the Florin, and 1,000 to the Pound. Thus, without altering the mode of stating accounts, and with but a slight change in value (and that in the Copper Coins and Fourpenny-pieces only), a complete Decimal System will be attained. Our accounts, therefore, will stand thus:—Pounds, Florins, and Cents, and the relative value of the coins will be

| | | | | |
|---|---|---|---|---|
| A Sovereign.............. | equal to | 1,000 | Cents. | |
| Half-sovereign ......... | ,, | 500 | ,, | |
| A Crown .................. | ,, | 250 | ,, | |
| Half-crown ............... | ,, | 125 | ,, | |
| A Florin .................. | ,, | 100 | ,, | —or 1-10th of a Sovereign. |
| A Shilling.................. | ,, | 50 | ,, | |
| Sixpence .................. | ,, | 25 | ,, | |
| Fourpence ............... | ,, | 16⅔ | ,, | |
| Threepence .............. | ,, | 12½ | ,, | |
| A Penny .................. | ,, | 5 | ,, | |
| A Farthing, or Cent ... | ,, | 1 | ,, | —or 1-100th of a Florin, and 1,1000th of a Pound. |

The change of making the Sovereign equal to 1,000 Cents will necessarily alter the denomination of the present Copper Coins and Fourpenny-pieces to a slight extent, and our Pennies and Fourpenny-pieces might be called in, the former to be replaced by a new coin of the proportionate value now proposed. A great additional advantage in this plan would be, that the existing habits and customs of the people would not be disturbed further than is absolutely necessary to the adoption of a Decimal System."

The Report concluded by recommending that the subject should be brought under the notice of the President of the Board of Trade, the Chancellor of the Exchequer, the Chairman of the Board of Inland Revenue, and the Governor of the Bank of England. This, Mr. BROWN observed, had been done; and he had himself, a day or two ago, seen the Governor of the Bank of England, who told him that the Chancellor of the Exchequer had recently communicated with the Bank to ascertain the expediency of such a change, and they had replied that it would be very desirable. The Bank of England had already taken the initiative in the matter, for they would only buy and sell gold and silver decimally. The letter forwarded to these authorities by the Liverpool Chamber of Commerce recommended, substantially, the adoption of the system just mentioned. Mr. Brown then referred to the plan, recommended by many scientific men, of assimilating our coinage to that of other countries. The fatal objection to that was, that we could have no certainty they would not debase our coins. For instance, he saw the other day in an American paper a proposal to exchange for half or three-quarters per cent., and to change the value 7 per cent.: thus there would be a great danger of our coins returning with less gold and silver in them. The loss and expense in which this country might thus be involved would best be seen by referring to the exports of gold for the last six years. He concluded by saying that he had brought the matter before several Members of Parliament, begging them to call the attention of the Board of Trade to its advantages. That Board, he knew, was not unwilling to engage in the matter, if the country was ready for the measures. His advice was, therefore, that the House of Commons should be memorialised on the subject.

Mr. JAMES YATES, F.R.S., offered some remarks on the various systems and their relative advantages, but thought that so long as men had ten fingers they would reckon by tens and multiply and divide by decades. He thought, as a perfect system, nothing was preferable to the French, which, in something like twelve names, comprised the whole range of Weights, Measures, Coins, &c. In confirmation of that view, he referred to the opinion of John Quincy Adams. He explained the philosophy of the French basis in taking a certain portion of the meridian, reckoning from the pole to the equator. He then proceeded to speak on the advantages of a system of coinage which was of one value in different countries, as was the French money in different parts of Continental Europe.

**Captain Owen**, R.E., coincided with Mr. Yates, but thought the only objection to any present change was the probability that in the course of a few years a European Congress might sit to decide such questions.

The **Chairman** then proceeded to detail the history of his interest in, and acquaintance with, the subject, since the year 1831, during which period he had given every moment of spare time he could command to the study. It appeared to him that a standard of measure ought to be adopted which should be universal to mankind, and he considered the terrestrial meridian the proper standard; he meant the nautical, geographical mile; this was the standard recognised by every nation of the earth. He found that the thousandth part of this mile was very nearly an English fathom; and if we adopted this instead of our present foot and yard, and took the sixth part of a fathom as a standard foot, this would be the best standard for lineal measure. The change thus proposed was exceedingly trifling, being, in regard to our present standard, as 80 to 81. For superficial measure the foot alone should be the unit. In land measure he proposed that 100 links form 1 chain equal to 10 fathoms, and 100 chains 1 mile; 100 square links should be 1 square fathom; 1,000 square fathoms, 1 square acre; 1,000 square acres, 1 square mile. In measures of capacity, the cubic foot should be the only standard. In regard to weight, he proposed the pound as the standard, with tens, hundreds, and thousands, as its only multiples. Halves and quarters were admissible as agreeing well with a decimal system. In regard to money, he coincided with Professor Jack and Mr. Brown, choosing 1*l.* sterling as the unit, the hundredth part to be called a cent., and of that the tenth part might be called a farthing. Shillings and sixpences might be retained; a shilling being 5 cents, and sixpence 2½ cents. A system like this might become universal, and be adopted by the whole world; and if it were so, the benefits would be incalculable.

After a vote of thanks to Professor Jack for his communication, the Secretary announced that at the next meeting, on the 2nd of March, a paper would be read by W. Sterling Lacon, Esq., "On the Management of Ships' Boats, and the Loss of Life at Sea."

## LECTURES ON COTTON.

The second and third Lecture of Mr. Warren's course on the Cotton Trade and Manufacture, were delivered on the evenings of Thursday, the 17th, and Monday, the 21st. Want of space prevents the insertion of the report of those lectures this week; it will be given, together with a brief abstract of the concluding lecture, next week.

## INTERCHANGE OF PRIVILEGES.

The list of Institutions which have agreed to the general interchange of privileges, as stated in the last number of the Journal, will shortly be published; the Secretaries of those Institutions desiring to join in this arrangement, and which have not already communicated their intention to the Secretary of the Society, are requested to do so.

## PHARMACEUTICAL EDUCATION.

The following letter, on the adaptation of Literary and Scientific Institutions to Pharmaceutical Education, from a correspondent at Modbury, appeared in the last number of the *Pharmaceutical Journal*:

"On reading your remarks headed, 'The Lectures at the School of Pharmacy,' Mr. Scholefield's communication, 'Pharmaceutical Education, Means to the End,' and the observations of 'Juvenis' in the December number of the *Pharmaceutical Journal*, the idea occurred, that probably the difficulties of each case, and also with regard to the publication of lectures, might, to a certain extent, be overcome, by organizing a systematic plan of *class teaching* throughout the country. It is a well known fact, that in almost every town there exists a 'Mutual Improvement Society,' 'Literary and Scientific,' or 'Mechanics' Institution,' —225 of which, numbering 90,000 members, have recently joined themselves in union with the Society of Arts, London.

"Would it not be desirable that in remote districts, where no Philosophical Society exists, for the express instruction of young men in the various branches more immediately connected with the routine of a Pharmaceutical education, advantage should be taken of the opportunity afforded by the above-named Societies, and every inducement held out in urging our youth to become members, and form *classes* for the study of Languages, Botany, Chemistry, and the various branches of Natural Philosophy, according to time and requirements. Very many of these Institutions are already supplied to a certain extent with chemical and philosophical apparatus; and it only requires combination and 'willing private instructors in the principles of the present day for the purpose in view.'

"This is not expecting too much of those who have the cause of education at heart: and I am of opinion with Mr. Scholefield 'there are few towns where some one would not be found gratuitously, or for a trifling remuneration, competent' to the above undertaking, 'which I think would be eagerly sought after and supported;' more especially as 'the Council of the Society of Arts are engaged in endeavours to procure from men of eminence, *MS. lectures* which may be circulated among the associated Institutions, to *organise a system of class teaching, and to provide a collection of diagrams, models*, &c., *for illustrations*.' Though these may not treat directly of Pharmacy or Materia Medica, yet they would embrace Chemistry and other branches of physical science, thus indirectly supplying an invaluable amount of information bearing upon the above subjects. With the many excellent treatises on Chemistry, Pharmacy, and Materia Medica, already in existence, and the aid offered through the associated institutions by the Society of Arts, it is to be hoped members of the Pharmaceutical Society, many of whom are highly competent to the task, will take the lead, selecting from among themselves those best qualified as tutors, and preside over classes of associates, apprentices, and others, for mutual instruction.

"The early closing of shops in most towns is an additional reason for devoting a portion of the time rescued from business to study, and where can it be more profitably turned to account than in the class room?

"'All branches of science are so intimately connected, that a *compound institution* might be maintained by uniting several societies, and arranging the meetings so as to accommodate each in its turn.'

'The above suggestions are not intended to depreciate the value of lectures; on the contrary, those students most diligent in a class will be found best able to appreciate lectures of professors, whether delivered orally or read from a report."

## HOME CORRESPONDENCE.

### SCHOOL-SITES ACTS.

DEAR SIR,—Having seen a great deal of the working of the School-Sites Acts, I am desirous to express my dissent from several of the opinions published in the last Journal under the signature of "F. P." It would be difficult to over-estimate the advantages which the promoters of Schools have derived from these Acts. Under them have been executed and enrolled at least 3,000 conveyances, not one of which, as far as I know, has been called in question. It is a mistake to suppose that the "machinery" by which these Acts are "to be worked" is "applicable to Schools, but not to Institutions." Some of the provisions, in reference to Parliamentary grants and other points, would be inapplicable to, and imperative upon, Institutions; but the leading principles and facilities afforded by the Acts might, with very great advantage, be rendered applicable to Institutes.

Whether it would be better to adopt the course suggested by the Committee—that is, to declare the School-sites applicable to Institutions—or the course suggested by F. P.—that is, to insert all the requisite provisions in full detail in the Institutions' Act, whether they be taken from the School-sites Acts or elsewhere—is, of course, an important question; and it seems to be not less important to bear in mind that the difficulty of carrying through Parliament a Bill framed on the latter plan would be very much greater than on the former. Perhaps the best course would be to get the Government to consolidate the School-Sites Acts into one Act, and then to provide by the Institutions' Act that the Consolidated School-Sites Acts shall be applicable to Institutions as well as to Schools. Yours faithfully,

Brighton, Feb. 23, 1853. H. C.

## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

INSTITUTION OF CIVIL ENGINEERS, Feb. 22.—J. M. Rendel, Esq., President, in the chair. The evening was entirely devoted to the renewed discussion of Mr. B. Cheverton's Paper, "On the use of Heated Air as a motive power."

The construction of Ericsson's Engine, and the application of the regenerator were first described, and it was then argued, that the action of the regenerator almost amounted, theoretically, to the creation of force, and that it was not of the utility that had been presumed. From the best accounts, it appeared that various practical difficulties existed, in the application of heated air as a motive power, and from calculations which were entered into, it was shown, that the mean pressure of the air in the working cylinder being 4¼lbs., the engines making eleven strokes per minute, a total power was developed, which, after making a proper deduction for friction and waste, did not exceed 280 horse power with the cumbrous machinery which was described; it was then contended that with such a fine model of a ship, and under the circumstances of the experiments, a greater speed than seven miles an hour ought to have been attained, with a less expenditure of fuel, and that, therefore, at present, the Caloric Engine could not be practically regarded as a successful innovation.

Tables and diagrams were exhibited, for the purpose of showing the relative amount of power obtainable from a given quantity of heat, applied in expanding air and in producing steam. From these it appeared that after taking into account all the conditions of each case, the useful effect would be nearly the same, independent of the regenerator, which, if not a fallacy, would turn the scale in favour of the use of heated air.

It was submitted by other speakers, that the machine involved a mechanical fallacy, as the regenerator produced no mechanical effect whatever. It might be granted, that the regenerator of Ericsson's engine received and re-delivered the heat, in the manner described, and that when the working piston was descending, the heat was deposited, and that when ascending the heat was restored; but that operation could only result as a *consequence* of the motion of the piston, and not as a *cause* of its motion—hence no mechanical effort was made. This result was easily shown, by assuming the contents of the pump to be 1, and the contents of the working cylinder to be 2. If the working piston was at the bottom of the cylinder, and in equilibrium with the external atmosphere, as regarded the pressure on a unit of surface, and then began to move and the air to be heated, in its passage through the regenerator from 32° to a temperature of 512°, so as to double its volume, the lower piston would constantly produce a vacuity, so to speak, of 2, to be constantly fed by a supply of 1, from the pump, expanded into 2, by the increase of temperature. Consequently the piston, at every instant of its motion, remained in equilibrium with the external atmosphere, and no mechanical effect could result. Still in Ericsson's engine a mechanical effect had been produced; but then this mechanical effect was no greater than would be produced without the aid of the regenerator, by the simple action of the furnace itself, and not so economically as by the use of steam.

Further investigations were entered into of the theory of the Air Engine, and the general result appeared to exhibit so much distrust of the accounts already received, of the working of the caloric ship, that it was suggested, that the further discussion of the subject should be adjourned for a few weeks, and meanwhile another paper was proposed to be written, so that the question could be more fully discussed on the next occasion.

## PROCEEDINGS OF INSTITUTIONS.

BOSTON.—The Annual Meeting of the Members of the Athenæum took place, in the Guildhall, on Friday, the 18th inst.; W. H. Adams, Esq., J.P. (one of the Vice-Presidents), presided. The Secretary, Mr. J. W. Bontoft, read the report; from which it appears that the Institution is still progressing. There are 420 members. The financial position is satisfactory,—a small balance being in the hands of the Treasurer. The supply of the reading-room, rent, &c., is estimated to have cost, for one year, 83*l.* 9*s.* 4*d.*; and the library, 62*l.* 15*s.* 3*d.* The gross receipts for the year amount to 184*l.* The books in the library number 1,860, and have circulated 4,818 times. The circulation of periodical literature (principally newspapers) amounts to 4,350 entries. Several gratuitous lectures have been delivered during the season. There are two classes, French and reading, in operation. In regard to the Union with the

Society of Arts, the report stated that, "Your Committee are happy to say that their expectations have not been disappointed; for though only a short time has elapsed since the formation of the Union, they have experienced, in several ways, the advantages of such a connection. * * * With further time and experience, there is every prospect of the scheme being extensively developed, and of its becoming of great value to the united Institutions; extending and developing their resources, so as to bring them up to the requirements of the times, and in yielding valuable assistance in the important work still to be done in increasing the knowledge, improving the manners, and, consequently, augmenting the usefulness and happiness of our growing population." In reference to a new and suitable building for the Athenæum, the report says: "Ere the members can expect to participate in all these benefits, better accommodation must be provided,—a suitable and commodious building must be obtained, in which all the objects of the Athenæum can be carried fully into practice. In many towns beautiful and commodious edifices have been erected, devoted to Science, Arts, and Literature,—an ornament to the place, an honour to the subscribers, and a blessing to the people. To obtain a similar blessing for the town and neighbourhood of Boston, ought now to become the paramount object of every member of the Institution." A vote of thanks to the Chairman, and one to the Secretary, concluded the business of the meeting.

BURNLEY.—A Lecture on "The Historic Evidence of the Genuineness and Antiquity of the Mosaic Narrative," was delivered to the Members of the Mechanics' Institution, on Thursday evening, the 17th inst., by the Rev. Alexander Strachan, Wesleyan Minister. The Lecture displayed considerable learning and research, and was well received by a numerous audience. Additional interest was afforded by the exhibition of a number of well-executed diagrams, illustrative of the hieroglyphic or symbolic writing. It is intended that the Lecture should be published; and Mr. Strachan will probably deliver a second Lecture, in continuation of the subject, contrasting the Mosaic narrative with the accounts of heathen nations.

CARLISLE.—On Tuesday last, Mr. Joseph Bendle delivered an entertaining Lecture, "On the Atmosphere," to the Members of the Mechanics' Institution. The Lecturer stated that one of the main objects he had in view in addressing them was, if possible, to create a greater taste for scientific literature. The different properties which the atmosphere possesses, in common with all matter, was investigated and illustrated by a series of beautiful experiments. The construction of the air-pump was fully explained, as well as that of the ordinary pump and force-pumps, diagrams of which were displayed. He referred to Ericsson's recent invention of the caloric-engine, and spoke of the probability of hot air, in the course of time, entirely superseding steam as a motive-power. The constituents of the atmosphere, and the process of respiration, were also briefly alluded to.

CUPAR ANGUS.—On the evening of Wednesday, the 16th instant, the members of the Mutual Improvement Society, along with a few friends, assembled in their meeting-room, to celebrate their Eighteenth Anniversary. The Chairman, Mr. James Simpson, in a very succinct and appropriate address, referred to the "Nature and Design" of the Society, and was followed by Mr. John Mill, on "Mental Activity and Moral Worth, essential pre-requisites of Physical Elevation and Political Advancement;" by Mr. Peter Fergurson, on "Brotherly Kindness;" by Mr. Robert Robertson, on "Youth, the season for Improvement." The proceedings were greatly diversified by the "Exhibition of Dissolving Views," and by Music, both of a sacred and secular character.

POOLE.—Dr. T. Bell Salter, of Ryde, delivered, on Tuesday evening, to the members of the Literary Institution, a Lecture on "The application of the Fibres of common Plants to the purposes of Manufacture." The lecturer stated that he had been led to investigate it from the Exhibition of 1851, to which Mrs. Bevers, a lady in Ireland, had sent many articles manufactured by the peasantry from the fibres of several common plants. He indicated the various orders and families of plants from which fibre could be procured, and then explained experiments which had been made by the lady in question, by himself, and others, on the matter, exhibiting specimens of plants, with fibre, thread, and articles of dress manufactured from them; the principal of these, and the one from which most benefit might be derived, was the common nettle; amongst others named as fibre-producing plants, may be mentioned, nasturtium, mallow, lavatera, geranium, broom, sweet-pea, chrysanthemum, hop, some plants of the jessamine tribe, &c.; and he had no doubt from the common asparagus if the plants were cut rather earlier than customary. The lecturer concluded by practically applying the subject, stating that Mrs. Bevers commenced her researches for the charitable purpose of finding profitable employment for the poor in her locality, and he urged the advantage that would be derived by ladies in England emulating her; instead of buying materials for the work they prepared for bazaars, &c., to extract the fibre from plants growing in their gardens and hedges, and have the same prepared for their work. Attempts of this kind might in time lead to the production of a valuable article which might be applied to many purposes for which cotton is now used, and national prosperity be increased by the production amongst us of another raw material.

SOUTHAMPTON.—Mr. George Buckland delivered a Lecture to the members of the Polytechnic Institution, on Wednesday evening, on "Musical Characteristics," which consisted of brief running comments on the universal influence of music and its innumerable associations, illustrated by a variety of descriptive and other songs, Mr. Buckland accompanying himself on the pianoforte.

ST. LEONARD'S-ON-SEA.—The *conversazione* and Exhibition, in connection with the St. Leonards' Mechanics' Institution, which for the last three weeks has been open in the Assembly-rooms, was formally closed on Tuesday last, the 15th inst.; Alfred Burton, Esq., President, in the chair. It appears that, after defraying all expenses, the Exhibition will yield a balance of about 80*l*., to be appropriated to the fund for building a new Institution; in addition to which a sum of 33*l*. has been subscribed. The number of visitors to the Exhibition, exclusive of the holders of tickets, had been 3,450; the number of Exhibitors upwards of 150, and the articles exhibited upwards of 1,200. The children of the St. Leonard's National Schools, and of the Hastings Union School, were admitted free. Papers on the following subjects had been read, viz.—"On Structural Changes in Iron," by Mr. J. Rock, jun.; "On the Study of Natural History," by Mr. W. R. Selway; "On some of the Curiosities in Natural History," by the same gentleman; "On Ancient History, suggestive of the means of extending Education among the Masses," by Horace Martin, Esq., President of the Battle Mechanics' Institution; "Why do Trees have

Leaves?" by Mr. Pitter; "On the Growth and Manufacture of Cotton," by Mr. Henry Lee; "On the Social Influence of Railways," by the Rev. J. Stent; "On some Improvements in Railway Carriages," by Mr. J. Rock, jun.; "On the Rebuilding of the Harbour at Hastings, and the State of the Shipping in the time of Elizabeth," by William Durrant Cooper, Esq., F.S.A. During the continuance of the *conversazione*, several papers on Galvanism and Electricity, illustrated with experiments were read; and one on Astronomy, by Mr. John Banks; and, lastly, one "On the Exhibition," by Mr. T. B. Brett.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

A neat Case, for holding the Numbers of the Journal for half a year, is now ready, and may be had of the Publisher, 186, FLEET-STREET, price 1s. 3d.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

### QUESTION FROM CORRESPONDENT.

*Varnish for Iron.*—Can you inform me what is the best mode of protecting iron from the action of the atmosphere? I have been told that a thin coating of shell lac is even better than boiled linseed oil. Can you tell me if this is really the case; and if so, in what manner it should be applied.—[No. 43.]

### ANSWERS TO CORRESPONDENTS.

*Photographic Apparatus*, *No.* 23.—A description of Beauford's Accelerator will be found in the *Artizan Journal* for June, 1851.—M.S.

*Copal Varnish.*—In answer to your correspondent, No. 42, I have found the following method most efficient for the preparation of copal varnish:—The ingredients that are generally used are copal, turpentine, and linseed, or nut oil. Various qualities of copal varnish are made for different purposes; inferior gums are often substituted for or mixed with copal. Fuse 7 lbs. of copal, and pour on it, by degrees, 4 pints of clarified linseed or nut oil (using nut oil in preference), heated nearly to boiling. When this combination is made remove it from the fire. When the heat is abated to 150 degrees, mix in, by degrees, three gallons of oil of turpentine of the same temperature. When cooled to 130 degrees, it may be strained.—T. Y.

## MISCELLANEA.

NEW CRYSTAL PALACE, SYDENHAM.—A close boarding has been lately put up completely enclosing the statue of Charles the First, at Charing-cross. Within Mr. Brucciani is engaged in moulding the statue and pedestal for the Crystal Palace Company. Considering the prominent position of this work of art, it is astonishing how few are to be found who have looked upon it with attention, or who are aware of its great merit. This is particularly the case as regards the pedestal, which is the work of the celebrated Grinling Gibbons, and is a remarkably fine design. The carving is now somewhat dilapidated; but this, it is presumed, the Company will have completely restored when erected as part of their building, where its beauties may attract the attention they deserve. If this move be one in the right direction, are there not other statues of a similar character of equal merit, now buried, as far as public observation goes, in the squares of the metropolis, which might with equal propriety be treated in like manner?

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 16th Feb.*, 1853.

112. Hops (Acres of Land under cultivation)—Return.
114. Hops (Excise Duties)—Return.
117. Trade and Navigation—Annual Accounts.
123. Bill (amended)—General Board of Health; Queen's College, Cork—Report of the President; Clergy Reserves in Canada—Further Papers.

*Delivered on 17th Feb.*

101. Public Income and Expenditure (Balance-sheets)—Accounts.
99. Metropolitan Burials Act—Return.
124. Bills—Union of Benefices.
128. ,, —Grand Jury Cess (Ireland); Case of the Madiais—Correspondence; Spain (Royal Spanish Decree)—Correspondence.

*Delivered on 18th Feb.*

105. Port of Dublin—Account.
107. Stipendiary Magistrates (Ireland)—Return.
109. Irish and Scotch Fisheries—Return.
126. Bills—Office of Examiner (Court of Chancery).
127. ,, —Sale and Purchase of Land; Colonial Possessions—Further Reports, Part II.

*Delivered on 19th and 21st Feb.*

137. Army Estimate.
115. Naval Receipts and Expenditure—Account.
118. Specie and Bullion (Bank of England)—Return.
120. Mail Steamers (Cape of Good Hope and India)—Correspondence.
130. Cape of Good Hope—Copies of Petitions, &c.
138. Kitchen and Refreshment-rooms (House of Commons)—First Report from Committee.
132. Bills—Elections.
133. ,, —Cruelty to Animals.
134. Clergy Reserves (Canada); Inclosure Commission—Eighth Annual Report; Tithe Commission—Report; Copyholds—Eleventh Report of Commissioners; Census of Ireland for 1851 (Agricultural Produce), Part II.

*Delivered on 22nd Feb.*

102. Trade and Navigation—Accounts.
136. Drunkenness, &c.—Return.
143. Bill—Oaths in Chancery, &c.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette*, 18*th Feb.*, 1853.

*Dated 17th Jan.*, 1853.

116. A. Inglesia—Measuring and gauging silk, cotton, &c., on reels.

*Dated 21th Jan.*

154. W. E. Newton—"Hawes' calendar clock or timepiece." (A communication).

*Dated 26th Jan.*

196. A. G. Cazalat—A new barometer and steam gauge.

*Dated 1st Feb.*

276. A. V. Newton—Block printing machinery. (A communication.)

*Dated 2nd Feb.*

279. A. E. L. Bellford—"Metallic oil," for lubricating, &c. (A communication.)
281. A. E. L. Bellford—Improvements in lifeboats. (A communication.)
283. A. E. L. Bellford—Furnaces for making wrought iron. (A communication.)
285. J. V. Kiddle—Improvements in cocks or taps.
287. J. J. Abadie and H. Lauret—Parasols.
289. T. Paine—Heels for boots and shoes.

*Dated 3rd Feb.*

291. M. Bower—Apparatus to prevent throwing up of mud by wheels.
293. W. S. Wright—Improved bath.
295. J. Bower—Pile-driving.
297. J. H. Johnson—Gas-burners
299. A. Tylor—Improvements in water-closets.
301. J. Crowther—Improvements in baking bread.

*Dated 4th Feb.*

302. W. Brown—Metallic bedsteads.
303. D. L. Price—Signalizing by electricity on railway trains, &c.
304. P. J. Jones—Fastenings for bands, belts, &c. (A communication.)
305. P. Webley—Repeating pistols and other firearms.

306. G. Winiwater—Application of explosive compounds.
307. J. Perkins—Treatment of bituminous substances.
308. R. Griffiths—Bolts and rivets.
309. J. Dudgeon—Machinery for raising propellers.
310. J. V. Asbury—Railway carriages.
311. W. Edgar—Improved boot.
312. G. Letts—Mincing meat and filling skins.
313. W. Walker—Apparatus for drying.
314. A. Woodward—Lever churn.
315. A. Woodward—Self-acting cam press.

*Dated 5th Feb.*

316. R. Prosser—Printing-rollers for calicos, &c.
317. T. Peacock—Weaving hat-plush, &c.
318. G. Hewitson—Measuring yarn as it is wound on rollers.
319. A. Wollowicz—Primers for firearms.
320. J. and J. Whitehouse—Knobs for doors, applicable to other articles of earthenware.
321. C. F. Werckshagen—Carbonate of soda and potash.
323. W. Crossby—Consumption of smoke.
324. J. Campbell—Treatment of textile fabrics.
325. H. J. Nichol—Garments for travelling.
327. E. Palmer—Railway-carriages.
329. J. Cowan—Propelling.

*Dated 7th Feb.*

330. W. Romaine—Rendering wood durable and uninflammable.
331. W. Scott, R. Brough, J. Rinoe, and T. Mann—Steam-engines.
332. J. L. Tabberner—Smelting iron ores, &c., and manufacture of lime.
333. J. L. Tabberner—Application of granite, &c., to ornamenting and construction of buildings.
334. A. J. Brooman—Sail-hanks, for securing staysails, jibs, &c. (A communication.)

*Dated 8th Feb.*

335. A. E. L. Bellford—Treatment of bituminous substances. (A communication.)
336. T. Howarth—Cement for steam joints, &c.
337. J. Buchanan—Propeller, and machinery for same.
338. T. Allan—Protecting telegraph wires.
339. T. Allan—Galvanic batteries.

*Dated 9th Feb.*

340. T. H. and S. Reynolds—Retarding progress of carriages.
341. H. Pooley—Weighing-machines. (Partly a communication.)
342. W. E. Newton—Digging and excavating-machinery.
343. W. Binks, S. Bennett, and T. Storey—Pumps.
344. J. Little—Lubricating.
345. W. Birkett—Treating soapsuds.
346. J. Seaward—Marine engines.
347. I. J. Machin—Nutcrackers.
348. C. Iles—Pointing wire.
349. J. Webster—Treating animal matters and manufacture of manure.

*Dated 10th Feb.*

350. J. S. Wilson—Consumption of smoke and gases, and utilizing the same.
352. C. Cuylits—Regulating speed of steam and other engines.
354. J. Hunter—Textile fabrics.
356. J. Anderson—Steam-engines.
358. H. M'Farlane—Machinery for excavating. (A communication.)

APPLICATION WITH COMPLETE SPECIFICATION FILED.

389. Looms for weaving. (A communication.) Feb. 15, 1853.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 10th Feb.*, 1853.

10. Freeman Roe, of the Strand—Improvements in valves and cocks.
109. William Austin, of Birmingham, and William Sutherland, of the same place—Improvements in ornamenting glass.
296. Alfred Trueman, of Swansea—Improvements in obtaining copper and other metals from ores, or matters containing them.
317. William Scholfield and Joseph Pritchard, of Oldham—Improvements in steam-boilers.
877. Thomas Ainsley Cook, of Wall's End, Northumberland—Improvements in bleaching.
898. William Edward Schottlander, of Southwark—Improvements in machinery for boring the ground, stone, or rocks, for the formation of drains and sewers, for the laying of pipes underground, and for removing obstructions therein; also in the manufacture of pipes to be used in connection with such machinery, and in instruments for surveying and levelling preparatory to the boring operations. (A communication.)
918. Joseph Skertchley, jun., of Kingsland, and of Ansty, near Leicester—Improvements in mangles and mangle-rollers.
959. James Murdoch, of Staple-inn—Improved galvanic battery. (A communication.)
1001. Anthony Norris Groves, of Madras, and Conrad William Finzel, jun., of Bristol—Improvements in condensing steam or vapours.
1058. Rudolph Appel, of 43, Gerrard-street, Soho—Improvements in anastatic printing, and in producing copies of drawings, writings, and printed impressions.
1068. Anthony Norris Groves, of Bristol—Improvements in apparatus for heating, drying, and evaporating.
1094. Alfred Krupp, of Essen, Prussia—Improvements in cannons.
1096. James Langridge, of Bristol—Improvements in the manufacture of stays.
1123. Warren De la Rue, of Bunhill-row—Improvements in preparing the surfaces of paper and card-boards.
1128. Ephraim Moseley, of Grosvenor-street—Improvements in the manufacture of artificial masticating apparatus.
1149. Jean Louis David, of Paris—Certain improvements in the manufacture of woollen fabrics.
1168. George Ingham, of Rochdale—Certain improvements in machinery for drawing cotton and other fibrous materials.
1171. George Gwynne, of Hyde-park-square, and George Fergusson Wilson, of Belmont, Vauxhall—Improvements in treating fatty and oily matters.
1183. Claude Joseph Edmée Junot, of No. 15, Rue Basse Passy, France—Improvements in the mode of reducing several metallic substances hitherto unused, and applying them so prepared to the plating of other metals and substances by means of electricity. (A communication.)
1184. Samuel Clegg, of No. 24, Regent's-square—Improvements in apparatus for measuring gas.
1203. Robert Steven Oliver, of Edinburgh—Certain improvements in waterproof and other garments.
14. Charles Edwards Amos, of the Grove, Southwark—Certain improvements in the construction of centrifugal pumps.

*Sealed 22nd Feb.*, 1853.

203. Robert Hazard, of 14, Lincoln's-inn-fields—A calorific bath.
576. Bowman Fleming M'Callum, of Govan Croft Dyework, Glasgow—A yarn drying machine.
851. William Wilkinson, of Nottingham—Improvements in the manufacture of looped and textile fabrics, and in machinery for producing the same.
1093. William Wilkinson, of Nottingham—Improvements in the manufacture of looped-pile and cut-pile fabrics, and the machinery employed therein.

*Sealed 23rd Feb.*

199. Edwin Bates, of 7, Great Portland-street—Improvements for deriving motive power from expansive fluids, and for the better application and economy thereof for propelling ships and other vessels in sea, river, and canal navigation; also, in the shape and action of wind-sails, the use of water as a motive power for driving machines, mills, &c., the construction of Turbine's air and water-pumps, marine-pumps for emptying ships of bilge-water, and other useful purposes.
253. Charles de Bergue, of Dowgate-hill—Improvements in machinery for punching metals, and for riveting together metallic plates or bars.
258. David Chalmers, of Manchester—Improvements in looms for weaving wire, web, or cloth by power.
330. Henry Moorhouse, of Denton, Lancaster—Improvements in machinery or apparatus for cleaning woollen, cotton, or linen rags and waste, which machinery or apparatus is applicable to cleaning and tempering clay, or other similar purposes.
560. Arthur Ashpitel and John Whichcord, the younger, of Carlton-chambers, Regent-street—Improvements in cocks, valves, and fire-plugs.
625. John Cameron, of Manchester—Improvements in boilers for generating steam, and in feed-pumps and apparatus connected therewith.
1188. John Whichcord, the younger, and Samuel Egan Rosser, of Great Russell-street, Bloomsbury—Improvements in the mode of burning and applying gas for light and heat.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Feb. 18 | 3423 | A Spring-hat, Bonnet, or Cap-suspender. | James Barlow | 14, King William-st., City. |
| „ 19 | 3424 | Pencil-case. | Joseph Baker | Birmingham. |
| „ „ | 3425 | The Multiple Gas-stove. | George Mair | 41, Up. Bedfd.-pl., Russell-sq. |
| „ 22 | 3426 | A Russian Bath. | Mathias Roth, M.D. | Old Cavendish-street. |

# SOCIETY OF ARTS.

FRIDAY, MARCH 4th, 1853.

## TWELFTH ORDINARY MEETING,

### *Wednesday, March 2nd,* 1853.

The Twelfth Ordinary Meeting of the Society was held on Wednesday, the 2nd inst., Charles Wentworth Dilke, Esq., Vice-President in the chair.

The following were elected Members:

Barnard, John Ansley Louis, 25, Holloway-place, Holloway.
Brown, William George, 9, Whitehorse-lane, Stepney.
Cotton, Michael G., Wanstead, Essex.
Hackblock, William, The Rock, Reigate.
Hudson, J. W., Ph. D., Athenæum, Manchester.
Martineau, David, Tulse-hill, Surrey.
Scott, James, 1, Eccleston-street, Chester-square.

and the names of five candidates for membership were read.

The Chairman stated, that in consequence of the sudden illness of a member of Mr. Lacon's family, he had been summoned into Norfolk, by electric telegraph, at four o'clock that afternoon. He, therefore, called upon the Secretary to read Mr. Lacon's paper "On the Management of Ships' Boats, and the Loss of Life at Sea."

After a brief statement of the reasons which induced Mr. Lacon to bring the subject before the Society of Arts, the Author proceeded:

I claim your attention, because, having been present during the long and patient investigation into the loss of the *Orion* before the High Court of Justiciary of Scotland in August, 1850, when the Captain was sentenced to eighteen months' imprisonment, and the mate to seven years' transportation, I am able to speak to you with confidence of the utter inadequacy of any means that have hitherto been adopted for the preservation of the lives of the passengers and the crews on board of ships in case of accidents; and because, notwithstanding various representations to the Government, and the most earnest appeals to parties interested in the matter, nothing has hitherto been done to remedy the evil.

That the subject is one of deep public interest I am assured, by notices of the press in this City, in Liverpool, in Glasgow, in Edinburgh, in Aberdeen, in Bristol, in Plymouth, in America, in Holland, in France, and in India: and is it not remarkable, that having been thrice ignored by the Admiralty, and thrice refused a trial in one of Her Majesty's ships, that within twelve hours of the receipt of the last refusal, intelligence should have been received of the loss of the *Birkenhead:* and is it not still more remarkable that six months ago, having gone down to Liverpool for only one day, I should have gone to the very vessel, whose loss we have so lately had to deplore—that I should have gone on board that very vessel and called one of the seamen to me—that I should have pointed out to him the improper manner in which the boats were secured, and that I should have cautioned him that a day might come when inattention to apparently such small particulars might cost many lives? That day has come, and those boats were useless: they were carried down with the ship when she sank, and were not disengaged from her till sixteen hours after the accident.

It is not my intention, however, on the present occasion, to go into the question of the general management of the boats, nor into the number of the boats carried by each ship, or the proportion of the boats to the tonnage. That the boats in most cases are inadequate to save the lives of those on board, is a fact so notorious, and may be proved by an amount of evidence so overwhelming, that I should only be trifling with your time were I to go into the matter here.

Still less do I desire to pass any strictures upon the duties that have been imposed upon the Government by the Legislature. I believe there is here a wide field for inquiry, and I leave it to others more able than myself to look into it. I confine myself to the fact, that notwithstanding the character of the boats, notwithstanding any inspection by the Government, the appliances for using those boats, and getting them into the water, are so essentially bad, that they have been condemned in an Official Report to Parliament in February, 1852, in the following words:

"The means of lowering boats evenly, and of readily disengaging the tackles, together with plugs which are self-acting, are desiderata wanting throughout the naval service, and that it may be expected that some useful method of supplying these defects will be devised."

Nay, I go further; and maintain, that the present method of lowering boats into the water is contrary to the acknowledged principles of mechanical science; and that, instead of an accident exciting any astonishment, an accident must be looked upon rather as the rule than as the exception.

I purpose, then, Gentlemen, to reverse the order of proceeding; and instead of beginning with the proofs of the dangers of the present system, I shall first explain to you what that system is, that you may be better able to follow me when I read the evidence to you.

In the ordinary mode of lowering a boat, it requires two men in the boat (one at each fall, to unhook,) and on board the ship, two men to lower, and two men to clear the falls—no easy matter where the falls are little used, and consequently stiff, and where, as in the case of the largest merchant-steamers, each fall is twenty-two fathoms, or 132 feet, long. Under any circumstances, it requires the greatest unanimity of action on the part of these six men; but how is this to be insured during periods of excitement and danger, and during dark nights? If one of the falls should be lowered too quickly—if one of them should foul, or be accidentally let go, then one end of the boat having reached the water before the other, it is impossible for the men in the boat to unhook at the same time, and an accident must inevitably happen. Or, supposing that all has gone right on board the ship, and that before the boat has reached the water, a sea should lift the stern of the boat and unhook the after-tackle, then (as in the case of the *Amazon*), "the boat would sheer across the sea before the people in her could unhook the fore-tackle, and they would thereby be washed out, and the boat would remain hanging by the bow;"

or if, in the act of lowering, a sea should strike the bow, and unhook the fore-tackle, then "the fore-end would immediately fall down, and the people would be precipitated into the sea and drowned."

But why, argued Mr. Lacon, is this operation of lowering a boat different from any mechanical operation of the like character? It is an acknowledged principle of mechanics, that to raise a weight requires a power; but what is gained in power is lost in time. We see it in the every-day operations of raising a weight, that when the weight has attained the requisite elevation, the power is disconnected, and a break, or other analogous contrivance, is substituted in order to regulate the descent.

Why, therefore, should not the same plan be adopted in the case of weights (boats), which remain for a lengthened period at the requisite elevation, and which are only required on sudden emergencies? That the principle was acknowledged even by sailors themselves might be shown in the case of the anchor.

After the anchor has been elevated by means of the chain to the level of the water, a tackle, called the "cat," is used to raise it to the level of the deck. This is the power; and sailors know very well that if they were to allow the same to remain, the anchor could never be used on sudden emergencies: they therefore substitute a single rope (called the cathead stopper), and remove the tackle. They remove the one tackle from the anchor: why, therefore, should they not remove the two tackles from the boats, which, it has been shown, in their use require the greatest unanimity of action?

In Mr. Lacon's method of lowering a boat this was proposed to be effected by a long bar, or rod of iron, with a barrel at either end, of a sufficient size to carry the requisite length of rope or chain, with a friction pulley and break in the centre. The ropes, or chains, are connected to the barrels in such a manner that they will support any amount of weight till such time as the boat has reached the water, when they will unship, and disconnect by their own weight; by which means he prevents the possibility of the boat being dragged forward, or capsized, or swamped, by the action of the ship. By means of the friction break he enables one man to regulate the descent of the boat, and by means of the parallel action of the two barrels he insures the boat descending evenly upon the water.

To show that the plan thus proposed was not mere theory, diagrams were exhibited of the fittings (drawn to scale) on board two of the South Eastern and Continental Company's ships, with a certificate of experiments conducted at Folkestone, on the 5th of August last, when a boat was lowered several times during the day, while steaming at the rate of twelve and a half knots, with Mr. Lacon and four men in her.

To illustrate the dangers of the present system, the following extracts from the evidence of the survivors of the *Amazon* were read.

Mr. Neilson states:—"In the meantime the aftermost boat on the port side (I think the mail boat) was lowered down, with probably twenty-five people in her, but the moment she touched the water she swamped, and all hands that were in her drifted astern, all clinging together with dreadful shrieks. The next boat forward (the pinnace) was also lowered full, but by some accident the after-tackle alone got unhooked, and she was dragged forward by the fore-tackle with such rapidity that the sea swept round her sides, and washed every soul out of her. At this time the second cutter had reached the water, when a sea struck her bow, and as the ship rose from the swell of the waves she lifted the boat perpendicularly by the stern tackle, and discharged all the unfortunate inmates but two, who hung shrieking across the thwarts."

Lieutenant Grylls, R. N., said:—"The first boat attempted to be lowered was on the port quarter. Lieut. Grylls was himself lowering the after fall, when Captain Symons seized him by the arm and besought him to desist, as he said everybody would be drowned. Lieut. Grylls then called out to the person by the foremost fall imploring him not to lower, as the ship was going so fast. The person at the foremost fall, by constant and urgent request of the people in the boat, let the fall go, by which means the boat turned over, and as nearly as could be seen every one was washed out of her. Seeing this at the moment, Lieut. Grylls attempted to let go the after fall so as to save them; but the fall being jammed and having fouled, and the boat thus not being clear, her stern hung in the air for a moment until cut adrift by some one, when she turned over; and seeing the people washed away, Lieut. Grylls turned aside from the appalling sight in horror."

Henry Wright, seaman, said:—"When in the boat, preventing her from being swamped by trying to clear the fore-tackle-fall, the block caught his left hand, and took off the tops of his two middle fingers and smashed his little finger."

Alexander Lang, quartermaster, said:—"Went to the wheel, but it was fouled by the tackle-fall of the dingy."

George Harding said:—"The tackle-fall of the dingy had entangled the rudder."

On the night of the 17th of June, 1850 (a calm and comparatively clear night), the *Orion* struck upon the outer Ward Rock off the harbour of Portpatrick. Mr. Lacon then read from a copy of the indictment:—"She had four boats, two of them life-boats; of these one of the quarter-boats when being lowered was capsized or swamped, in consequence of the tackle being out of order, and unfit for immediate and effective working; while one of the life-boats was never got effectually or completely disengaged from the ship until at or near the time when the ship went down, when the said life-boat was turned over by the said ship in sinking, and was capsized or swamped in consequence of her not being previously and timefully disengaged from the said ship, or lowered or set free in the sea, because of the undue delay and difficulty occasioned, as above libelled, by which means various persons who had got within the said quarter-boat and life-boat respectively were thrown into the water and drowned."

D. Walker, seaman, in his evidence before the High Court of Justiciary in Edinburgh, stated, that while lowering the starboard quarter-boat, the bows were down in the water while the other end hung by the tackle, and one or two tumbled out of her; and while the port life-boat was lowered, there were one or two tumbled out of her!

Robert Wilson, Clyde-Pilot of the *Orion*, says, speaking of the larboard life-boat, "I could not lower the tackle on account of the weight in her." Of a complement of 200 persons, crew and passengers, forty of them were drowned.

The *Avenger*, a steam-frigate, Capt. Charles Napier, with an armament of six heavy guns, and a crew of 250 men, sailed from Gibraltar on the 17th of December, 1847. At nine p.m. on the 20th of December, while running with square yards at the rate of eight or nine knots, under double-reefed topsails and reefed foresail, she struck upon the Sorelli. The officers in the gun-room were upon the point of retiring to their berths, when they were startled by a sudden jerk; the ship gave a heavy lurch, as if filling, and her whole frame appeared shaken, and every beam loosened. The captain then gave the order "out boats." These were his last words, for he was immediately afterwards washed overboard and drowned. Whilst they were in the act of lowering the cutter, an accident occurred which was nearly proving fatal to all their hopes of preservation: in lowering the boat the foremost fall got jammed, and the after one going freely the boat had her stern in the water and her bows in the air. At this moment Dr. Steel threw in his cloak, which fortunately got into the sheeve-hole of the after fall and stopped it. Just as the boat touched the water, and before the tackles were unhooked, the ship again struck heavily and began swinging broadside to the sea, falling over to starboard at the same time, which, from the cutter being the port one, made her crash with great violence against the ship's side. However, by dint of great exertion, the boat was got free from the tackles and pulled clear of the ship. Of a crew of 250, 246 were drowned!

In July, 1843, the *Pegasus* left Leith at half-past five, P.M. It was a most beautiful evening, perfectly calm, and very smooth water. At half-past twelve she struck upon the Goldstone Rock, near the Fern Islands, about two miles from the shore. The only two boats on board (both of them quarter-boats) were lowered by the passengers, contrary to the captain's orders. The passengers were all crowding into the boats, and all that so got into them were drowned. One of the crew states, that "they had no idea of the weight of it; they let go the boat, and it filled with water immediately." The boats were swamped before the vessel went down. There were no seamen among the passengers who took charge of the boats in lowering them down. "I went to the master first," said William Brown, the mate, "and there was one of the boats hanging over the end when I went back."

At midnight, on the 7th of April, 1843, the *Solway*, when about twenty miles west of Corunna, struck upon a rock; she was backed off, and in twenty-five minutes afterwards she sank while making for the shore. Whilst proceeding towards the land, a general rush was made to the pinnace, which hung at the davits on the larboard side; twenty-five persons got into her, and, having seated themselves, cried out to those on board to lower away. Captain Duncan, who evidently foresaw the great danger of lowering a boat at full speed, endeavoured to prevent this; but the confusion was so great on board, and his own attention so entirely devoted to the great object of getting the paddle-box life-boats afloat and making the shore, that his opposition was of no avail, and the forward tackle was let fly by the run, and the bows of the boat dropped into the water. The situation of the poor wretches, who had made this their hope of escape, was now perilous in the extreme. A cry of "For God's sake, let go the after-tackle!" was answered by some of the crew as soon as possible, and the pinnace fell into the water. The ship had still full speed upon her; and now a heavy sea striking the boat, as she floated for an instant, swept every soul into the ocean!

In the wreck of the *Conqueror*, near Boulogne, on the 13th of January, 1842, the ladies, children, and servants were handed into the cutter; the water was not above a couple of yards off her bottom, but the falls of the tackle had got so entangled with the rest of the cordage upon the poop, that they were not able to lower them. The captain cut the boat from the davits.

From the loss of the *Kent* by fire, in the Bay of Biscay, on the 1st of March, 1825, when eighty-one individuals perished, an account of which was published in an excellent little pamphlet by the Religious Tract Society, Mr. Lacon selected the following extract:

"Although Captain Cobb had used every precaution to diminish the danger of the boat's descent by stationing a man with an axe to cut away the tackle from either extremity, should the slightest difficulty occur in unhooking it, yet the peril attending the whole operation, which can only be adequately estimated by nautical men, had very nearly proved fatal to its numerous inmates. After one or two unsuccessful attempts to place the little frail bark fairly upon the surface of the water, the command was at length given to unhook. The tackle at the stern was in consequence immediately cleared, but the ropes at the bow, having got foul, the sailor there found it impossible to obey the order. In vain was the axe applied to the entangled tackle; the moment was inconceivably critical, as the boat, which necessarily followed the motion of the ship, was gradually rising out of the water, and must in another instant have been hanging perpendicularly by the bow, and its helpless passengers launched into the deep, had not a most providential wave suddenly struck and lifted up the stem, so as to enable the seaman to release the tackle. The boat being thus dexterously released from the ship, was seen after a while from the poop, battling with the billows."

On Saturday, the 20th of November, 1804, the English fleet, under the command of Admiral the Hon. W. Cornwallis, lay at anchor in Torbay. As it was late in the year, and the night dark and stormy, orders were given for the fleet to put to sea. Unfortunately, in fishing the anchor of the *Venerable*, 74, the fish-hook gave way, and a man was precipitated into the sea. The alarm was immediately given, and one of the cutters was ordered to be lowered. Numbers of the crew rushed aft to carry the orders into effect; but, in the confusion, one of the falls was suddenly let go, the boat fell by the run, filled, and a midshipman and two of the men were drowned. In a few minutes another boat was lowered, which fortunately succeeded in picking up the man who first fell overboard. Owing to this delay, the *Venerable* fell off considerably towards Brixham, and, getting stern-way, was unable to weather the Berry Head. Every effort was made to stay her, but the ship refused; and not having room to wear, she drove on shore at the north part of the bay on a spot called Roundem Head, near Paington. In sixteen hours from the time she first struck, the whole vessel had disappeared, under the action of a raging surf lashed into fury by the violence of the gale. The crew consisted of 590, of whom a few were drowned.

The last instance, continued the author, to which I wish to direct your attention, is a most melancholy one, and may, perhaps, be in the recollection of many of you. This occurred on the return of the *Melville* flag ship from the East Indies, when the gallant son of the Admiral was drowned, in his attempt to save the life of a seaman who had fallen overboard. I am not aware that there is any printed account of the occurrence; so that I am glad of this opportunity of putting it upon record. The letter which I am now about to read is from Captain A. S. Hammond, R.N., to Lieut.-Colonel Willes, R.M., both on board of the ship at the time—the one as lieutenant, the other in command of the Marines:

"On the occasion of Sir John Gore's son being drowned, off the Cape of Good Hope, on the 30th of April, 1835, the *Melville*, seventy-four guns, on board of which ship the Admiral's flag was flying, was lying to, under a main trysail. The courses were being hauled up, and topsails lowered on the cap, with yards braced in and secured. A man having fallen overboard from the weather fore-yard arm, Lieut. John Gore, the flag lieutenant, jumped overboard to save him, from the weather quarter boat; and soon afterwards the lee quarter boat was cleared away and lowered, with Lieut. Fitzgerald in her, and ten men,—at which operation I attended. But, in spite of every attention, from the heavy lurching of the ship, and her rolling to windward, a considerable quantity of water was shipped by her; and I am also of opinion the boat was shaken by the blows which she received in striking against the ship's side whilst in the act of lowering.

"In consequence of this impression, I spoke to the Captain (the present Rear-Admiral Sir Henry Hart, K.C.H.), and asked him if I might be allowed to take the weather-quarter cutter, in case of any disaster having happened to the other boat; to which request, after some consideration, he gave his consent, and I jumped into her, quickly followed by numerous volunteers, and a fine young Middy of the name of Heath, (the present Commander of that name, and now in command of the Screw Sloop, *Niger*).

"Any amelioration to the old established plan of lowering boats, would, in this instance, have been of infinite service; for I have never witnessed a worse occasion for lowering a boat during my experience at sea. From the weight of men in her, and the constant lurching of the ship, we were nearly thrown out of the boat frequently, and I thought she would have been stove in, from striking against the muzzles of the main-deck guns; and before we could get the tackles unhooked, the indraught took us under the counter; and we had the nearest escape possible from being swamped by it. Fortunately we managed to get clear of the ship without mishap, and proceeded on our search, which proved, alas! a most fruitless one, as all hands were lost except ourselves.

"Don't you recollect," continues Capt. Hammond, "when a man fell overboard from us, just after leaving the Sand Heads, and a quarter-boat was lowered, with, I think, Crawford in her, and the boat's crew, and something happened to the boat's tackle falls in lowering, and threw the whole of the men into the water, and they also went astern together with the swamped boat, oars, bottom boards, &c., floating about! Fortunately no lives were lost, but there might have been!"

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Capt. **Henderson** fully concurred with Mr. Lacon as to the great advantages which would accrue from the use of the proposed plan of lowering boats. A great objection was, however, the expense it involved, the cost of the apparatus for lowering being considerably more than that of the boats themselves. This would be a fatal objection to its general use amongst our ships, estimated at about 23,000 in number. Of these about 600 were large passenger-steamers, and with these, expense in anything which involved a question of life and death ought not to be made a consideration, especially when it was remembered that the owners were sufficiently well paid to enable them to take such precautions. For these large steamers nothing better could be devised than Mr. Lacon's plan; and the more especially, since many of the men on board these steamers were well accustomed to mechanical contrivances. He thought, with regard to such vessels, Government ought to take the matter up, and make it necessary that they should have on board the means of saving every man in the vessel, in case of accident. But in regard to upwards of 20,000 of our ordinary sea-going vessels, there was both the question of expense, and the fact that the men were altogether unaccustomed to the use of such tackle. In small ships a boat would not cost more than from 10*l.* to 15*l.* or 20*l.*, whereas this new tackle for lowering would cost 40*l.*; and after all the expense, perhaps the men could not use it. After twenty-five years' experience, during which he had lost several boats, he had adopted the plan used in the Pacific by American whalers, where the six men who belonged to each boat had to manage the entire work of lowering themselves, and where, after they had seen a whale, every moment was of consequence. Capt. Henderson illustrated his meaning by reference to a model. Instead of the ordinary plan of using at each end one block, working between two sheaves, which, if the men did not heave fair, caused the rope to be jammed, he proposed to use two threefold blocks at each end, hung to the davits, which not only must work free, and prevent jamming, but, by giving additional purchase, enable the men in the boat to guide it themselves. He also strongly deprecated the practice of keeping boats covered, which was often customary. It was altogether unnecessary, and the cause of much delay and many accidents.

A conversation then ensued on the subject of plugs for boats, arising out of the repeated occasions in which, in case of accident, the plugs have been lost, as was the case in the recent wreck of the *Victoria* steamer. Various suggestions were made for securing them, or for the use of some kind of valve which would allow the water to escape from the inside, but would be closed by the pressure of the water underneath. Several contrivances had been patented for the purpose, all of which were to some extent good, it was stated; that the fact of their being more expensive than the common plugs, kept them from general use. The proper plan was to have the ordinary plugs secured beside the hole, and where that was not done, it was from neglect. A very efficient contrivance had been invented by Captain Claxton, which entirely superseded the plug; it consisted of a small brass tap, fixed in the side of the keel, by which the water escaped from the inside when opened, and when closed entirely prevented the entrance of the sea. Some remarks were also made on the mode of lashing the oars to the boats, and a strap and buckle was suggested to supply the place of cordage, as being more easily undone in the absence of a knife, in case of accident.

Mr. **Warren**, in answer to a question, said, by Mr. Lacon's plan of lowering, both ends of the boat must go down together; there could not possibly be any up-ending. It was a simple principle applied every day to the lowering and raising of all sorts of weights; the descent could be stopped at any moment; and it afforded absolute certainty of safe and equal lowering, so that the boat should reach the water on an even keel.

In answer to a question as to how long Mr. Lacon's plan had been before the public, and if it had been tried practically,

Mr. **Farley** stated, that it had been before the public about a year, and that it had been tried with great success. Some months ago the *Queen of the Belgians* steamer made the trial off Folkstone in a high gale of wind. He himself was on board. It was tried first with four men, and the boat was lowered safely whilst the steamer was going at full speed. Again it was tried with two men and Mr. Lacon with equal success, notwithstanding a heavy sea was running high at the time, and that the steamer was going at the rate of twelve and a half knots an hour.

The **Chairman**, in expressing the thanks of the Society to Mr. Lacon, regretted his unavoidable absence, but hoped that on a future occasion he would be able to attend and give them some *vivâ voce* information on the subject.

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A model of a small apparatus recently patented by Mr. Brae, of Leeds, was exhibited. Its immediate destination, is a self-retaining support for Venetian blinds; in which the inconvenience daily endured by the present mode of fastening down the lifting cords by twisting them round a couple of hooks in the window-frame, must be too present to every one's domestic experience to need description.

Contrivances for the purpose of self-supporting Venetian blinds are, it is true, already in partial use; but they are subject to many objections, one only of which need be alluded to—so weighty, that of itself it recommends any improvement that may obviate it: this is the necessity for the blind being originally designed and manufactured for the express apparatus intended to be applied to it, thereby excluding from help the many thousands of existing blinds constructed upon the old principle.

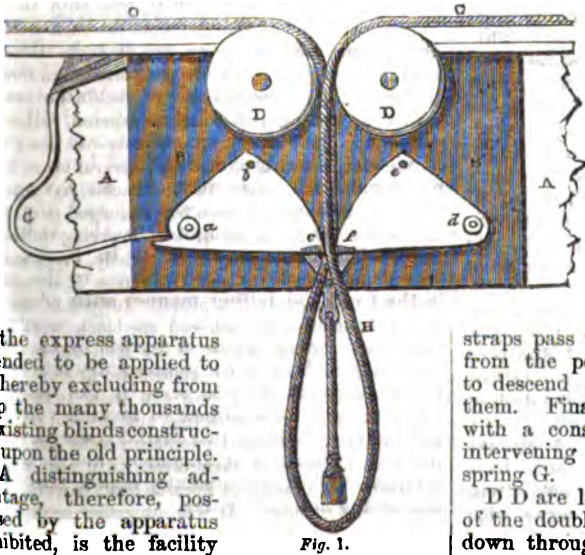

*Fig.* 1.

A distinguishing advantage, therefore, possessed by the apparatus exhibited, is the facility it presents for being attached to any blind, old or new; but there is another peculiarity which may or may not be considered an advantage, which is the option of placing the raising cords so as to hang down in the centre of the window instead of at the side, and thereby removing the operation to a more convenient and accessible situation.

The whole apparatus is contained in a small casing scarcely exceeding the size of a snuffbox, the interior of which is represented in the annexed drawing (*Fig.* 1); *a, b, c,—d, e, f,*—are two eccentric segments revolving upon the pivots *a, d.*

The radii *a b—d e* are shorter than the radii *a c—d f;* consequently when the segments are in the position represented in the drawing, their circumferential edges are nearly in contact; but when they are drawn down so as to cause the shorter radii to approach, a considerable space or opening will then exist between them. Each segment is provided with a similar segment of cogged teeth, only that these are not eccentric, but are portions of true circles, so that when together, the teeth of one working between those of the other, the two segments are always constrained to move simultaneously—for the sake of clearness these cogged portions are omitted in the figure.

Two straps are seen beneath the segments uniting in one shorter strap, from which the middle tasseled cord depends. These straps pass up behind the segments, and pulling from the points *b* and *e* cause the segments to descend and increase the opening between them. Finally, the segments are impressed with a constant tendency to close upon any intervening substance by the action of the spring G.

D D are leading pulleys, over which the ends of the double cord H are led, in the usual way, down through the blades of the blind, so as to gather it up.

It will be apparent from this description that when the double cord H is pulled downwards the segments will at once give way and admit of the blind being pulled up, but it cannot recede, because the tendency is then reversed, and the greater the pull the greater the resistance to it; therefore the blind remains at any altitude: and when it becomes desirable to lower it, the tasseled cord is pulled, by which the segments are again reversed, the resistance to the descent removed, and the extent of the descent regulated by the principal cords in the usual way. The small box containing the apparatus may be so constructed as either to be screwed on to the exterior of the top rail of the blind, or it may, as in the model, be bodily let into its substance.

Mr. Brae believes that the principle shown in this little invention may be usefully applied in many other cases, and especially in certain of the numerous operations on board ship, in which the power of tightening and firmly holding a rope or cord is required.

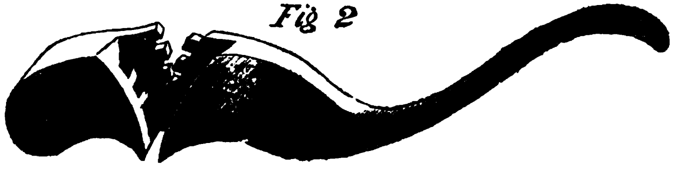

Fig 2

Fig. 2 represents the construction of the segments of the detainer, in its application to lowering boats from the davits, freeing life-buoys, and other purposes on board ship,—when, instead of a string for the back, and a spring to incline the longer radii to be opposed, a lever and counterpoise are used.

A specimen of china, coated with silver, was exhibited. Hitherto the art of electro-plating has been chiefly confined to metallic bodies, owing to their affinity for such deposits. The patent recently taken out by Mr. Ridgway, of the Staffordshire Potteries, extends it to Parian figures, ornamental china and glass, and to every description of Ceramic ware.

The advantages are manifold, when it is considered that this art may be applied to the most beautiful models, so as to retain all their sharpness and effect, without the cost of dies and other heavy charges to which the metallic department is subject, thereby cheapening the article; while by means of chasing and embossing, richness is given.

The mode of effecting the electro-deposit is as follows:—In the first place, the articles are steeped in strong alcohol, or certain gelatinous solutions, and when nearly dry immersed in nitrate of silver or otherwise, so as to prepare them for receiving the deposit of copper. This done they are plunged into cold water, and carefully dried in a suitable kiln, after which they are placed in sawdust for twenty-four hours to prevent oxidation.

The next operation is to remove any roughness on the surface which the articles may have contracted. This is done by means of sand paper or silver sand, and brushing with a scratch-brush, till they are made perfectly smooth, care being taken to remove any greasy matter from the surface.

The copper and silver have now to form one alloy, so as to unite them firmly together. For this a film of quicksilver is employed, dissolved in nitric acid. This is set aside to crystallise, and the crystals are dissolved to form the desired solution: the articles are then dipped therein, passed through water, and introduced into the vat containing the silver solution.

The silver solution consists of metallic silver dissolved in nitric acid diluted with water, with the addition of certain cyanides, till a given result is obtained. This is followed by a repetition of the copper process only with the silver solution, and the articles in due time appear in their silver garb, ready to receive the chasing.

Gold is prepared by being dissolved in nitro-muriatic acid. This chloride is digested with calcined magnesia, and the whole precipitated into an oxide. The oxide, boiled in strong nitric acid, dissolves the magnesia, and when washed forms a cyanide of gold and potassium.

The films of gold are deposited in the vessels by means of voltaic electricity,—a process requiring careful observation, both to ensure an adequate coating and the proper colour; if defective, it will have to be repeated.

The time of exposure to the heat depends upon its intensity, and the colour desired to be produced: these must be the fruits of experience, and will not fail to be acquired by practice.

The finishing process is the burnishing, which is the same as with the silver, and requires no further illustration.

## THE COUNCIL MEDAL AWARDS AT THE GREAT EXHIBITION.

Every one who took an interest in the vast display of 1851, at Hyde-park, must have regretted that in consequence of its extent, and of the Jury Awards not being published till it was closed, no opportunity was afforded to the public of viewing the objects which had been selected by competent authorities as displaying the greatest amount of ingenuity, and the most advanced stage of progress in the Industrial Arts. The information exists in books, it is true; but has never been realized to the senses in the fresh and telling manner with which the Exhibition has familiarized us. To supply this want, and bring the chief results of the great gathering in Hyde-park prominently into notice, the Council, as will be seen by the subjoined circular, have determined to form a collection illustrative of the Council Medal Awards, which, studied in classified arrangement, and in a small compass, will, it is confidently hoped, prove both interesting and instructive.

Society of Arts, Manufactures and Commerce,
Adelphi, London, Feb. 25th, 1853.

Sir,—The Council of the Society of Arts have determined on forming a collection of objects either in the shape of specimens, models or drawings, illustrating the awards of the Council Medals made at the close of the

Great Exhibition of 1851. The Council have been induced to take this course, believing that such a collection may be made the medium of conveying much information to the public of a highly useful and interesting character, and in a very attractive manner.

You will readily appreciate the value of thus bringing together, within the smallest compass and properly classified, a miniature picture of the most remarkable and important contributions to the memorable display in Hyde-park; and as you were among those who bore away a Council Medal on that occasion, I trust that you will consent to send me what you consider will best illustrate the object which won for you so honourable a distinction.

May I ask you to favour me with an early reply; and if in the affirmative, would you be so good as to say the amount of space required, and the nature of the objects you propose to send. It is desirable that the articles should be delivered at the Society's house, on or before the 1st of May of the present year, as it is intended that the Exhibition should be opened shortly after that date.

I am, Sir,
Your faithful Servant,
Edward Solly, *Secretary.*

## DUTIES ON PAPER, NEWS, &c.

At a recent meeting of the Institutes' Committee, the following Resolution with reference to the fiscal restrictions on Paper, Advertisements, News, and Foreign Books, were unanimously agreed to:

> "That with reference to the interests of the Institutes in Union with the Society of Arts, the Institutes' Committee requests authority from the Council to inquire into the subject of the operation of the present fiscal restrictions on Paper, Advertisements, News, and Foreign Books; and to communicate with the Institutes, and otherwise, upon this subject."

Upon this being submitted to the Council, it was unanimously Resolved by them:

> "That the Institutes' Committee be authorized to make the proposed inquiry in reference to its bearing on Arts, Manufactures, and Commerce generally, as well as on the Institutes."

## PHOTOGRAPHY.

With a view to extend the knowledge and appreciation of the art of Photography, as far as possible, the Council have recently addressed circulars to all the contributors to the late Photographic Exhibition, asking for their aid, either by the loan or presentation of specimens of their productions, in the formation of a collection to be circulated throughout the country, and exhibited at the different Literary and Scientific Institutions and Mechanics' Institutes in union with the Society. From the manner in which these circulars have been received, and the encouragement already accorded to them, it is believed a valuable series will be obtained; the more especially, as the Council of the Photographic Society have kindly promised to give all the assistance in their power.

While on this subject, it may be noticed that a suggestion was made to the Council at the close of the Photographic Exhibition, that another collection should be immediately formed of Photographic apparatus and implements. This suggestion has been adopted, and it is proposed to arrange and open a collection of this kind early in the ensuing month.

## INSTITUTE LECTURES.

It will be remembered that in the Report of the Institutes' Committee on this subject, which appeared in No. 8 of this Journal, it was stated that all applications for Lectures on "Physical Geography" and "Volcanoes and Earthquakes" had been committed to Mr. W. Hughes. Since that time Mr. Hughes has been in correspondence with the Secretaries of the several Institutions who so applied, and the results will now be briefly given. The Highgate Institution closed with Mr. Hughes at once for a course of four Lectures on Physical Geography, which are already in progress of delivery. He has agreed to lecture at Bury St. Edmunds, Sudbury, Coggeshall, Braintree, and Bishop Stortford, on five successive nights during the third week in March. He has similarly agreed to visit Stamford, Boston, Grantham, and Durham, on four successive evenings, early in April. Later in April he has arranged to lecture on four consecutive evenings, at Staines, Newbury, Winchester, and again at Newbury. And he has, in addition, undertaken to lecture on two consecutive evenings at Faversham during the present session, as well as to visit the Institutions at Thame and Bedford.

While acknowledging the courteous reception which his communications have uniformly experienced, Mr. Hughes remarks that more might probably be accomplished, even by an individual lecturer, if greater promptitude of decision were exercised by the different Institutions; and if, especially, there existed more of concert and pre-arrangement amongst the Institutions in any particular locality. The advantages of co-operation are nowhere so manifest, nor the desired result so speedily realized, as when several neighbouring Institutions, before submitting their proposals to the Society of Arts, have mutually come to an arrangement by which a lecture on any required subject may be delivered in succession, upon consecutive evenings, to the members of each. In such a case, the task of final arrangement—both to the Institution and the lecturer—becomes obviously very much simplified.

## LIST OF INSTITUTIONS TAKEN INTO UNION WITH THE SOCIETY OF ARTS,

*Since November 23rd, 1852.*

Bath, Athenæum.
Battersea, Literary and Scientific Institution.
Bodmin, Literary Institution.
Chelmsford, Literary and Mechanics' Institution.
Coggeshall, Literary and Mechanics' Institute.
Crieff, Mechanics' Institution.
Dublin, Statistical Society.
Hertford, Literary and Scientific Institution.
Holmfirth, Mechanics' Institution.
Kingsland, Dalston, and De Beauvoir Town Literary and Scientific Institution.
Lancaster, Church of England Instruction Society.

Lees (near Manchester), Literary and Scientific Institution.
Maldon, Literary and Mechanics' Institution.
Norfolk and Norwich, Literary Institution.
Norwich, Young Men's Institute.
Penzance, Institute.
Swindon, Library and Literary Institution.
Ventnor and Bonchurch, Literary and Scientific Institution.
Wellingborough, Parochial Lending Library and Reading-Room.
Wellington (Somerset), Literary Society.
Welshpool, Reading Society.
Wenlock, Agricultural Reading Society.
Whitby, Institution of Popular Arts, Science, and Literature.
Wiveliscombe (Somerset), Mutual Improvement Society.

The Union now comprises 255 Institutions.

## MR. WARREN'S LECTURES ON THE COTTON TRADE AND MANUFACTURE.

This Course of Lectures was brought to a close on the evening of Thursday, the 24th of February. For the purpose of illustration Mr. Warren has an extensive set of appliances, consisting, in the first place, of twelve model machines, constructed and capable of being worked with equal precision to any that are employed in a regular cotton-factory and print-works. He has also a large map of India, a magnified drawing of the cotton-plant, a drawing of the early methods of manufacture, a case of specimens of the varieties of cotton grown in British India and elsewhere, together with seeds, pods, cotton-oil, and oil-cake; a specimen of Hindoo calico-printing, a Hindoo dress and turban, a quantity of chemicals and dye stuffs; print-blocks of the earliest and latest construction; dye-vats, bleaching-troughs, engraving tools, and steaming apparatus. Mr. Warren commenced his first Lecture, by giving a sketch of the natural history of the cotton-producing plants.

The Tree Shrub and annual herbaceous varieties were passed under review, and the reasons given why the two former were valueless to the manufacturer. The mode of cultivating the latter was described, the designations of long and short staple were explained, and the uses to which they were respectively applied pointed out; as were also the situations in which they grew, the short staple growing inland, while the long staple flourished only on the salt-marshes and low islands along the sea coast. Some striking characteristics of the cotton fibre were then given, showing how naturally and beautifully this fibre was adapted, first for the purpose of being spun into yarn; and next for the retention of those forms and colours which the skilful calico-printer applied to them when woven into cloth. The rise and rapid progress of cotton cultivation in America, and its influence upon the slave population there, was next dwelt upon. The first importation of cotton from America to this country was one bag of 300lbs., in 1785. A short time prior to this, the number of slaves in the United States was 629,697; and so difficult was it to find profitable employment for them, that their reputed owners had a meeting to deliberate upon the propriety of freeing their bondsmen. The successful cultivation of cotton, however, gave a new turn to matters. The rapid progress of mechanical inventions for manufacturing this cotton caused the demand to keep pace with the increasing ability to supply, and has done so ever since. For some years past we had imported from America from ten to twelve millions sterling-worth of cotton. The yield last year amounted to the enormous quantity of 3,500,000 bales. The slaves have increased in number to upwards of three and a half millions, and in value to nearly forty millions sterling. In England more than two millions of people are dependent upon the cotton-trade for their daily bread; and it should be generally known that we relied almost solely upon America for the thousand tons and upwards daily required for the supply of our cotton-mills and manufactories. After having explained the necessity for separating cotton-fibre from the seed to which it adheres, the way in which this was originally accomplished, and the superior advantages of Whitney's Saw Gin—one of which Mr. Warren put in operation—he proceeded earnestly to show the dangers to which the entire trade of this country was exposed, by being thus dependent upon one country for the supply of this important article.

The coloured population of the world amounted to about twelve millions of human beings, nearly one third of whom were held in bondage in the cotton-growing states of America. The rapid spread of knowledge and commercial enterprise, together with the almost universal aspiration for freedom amongst the nations of the earth, was slowly, it may be, but certainly influencing this great branch of the human family, and it could not be supposed that they would always submit to the degradation to which they were now subjected. Any sudden attempt to free themselves from this bondage, whether successful or not, would be made at a sacrifice of, at least, one season's crop of cotton. Another danger existed from the fact, well known to those who had studied the subject, that the cotton plant was liable to diseases similar to those which affected the potato. A third danger arose from the constant efforts that were made by American statesmen, planters, and manufacturers, to raise the price and decrease the supply of cotton to this country, under the impression that by so doing they would enhance their own interests. This was bad reasoning, and worse policy on their parts; but nevertheless our trade had been jeopardised, and we had had to pay several millions more for cotton than we should have done, but for the existence of such a feeling. The amount of cotton produced in the States was constantly fluctuating. In 1847 there was a deficiency of 625,500 bales as compared with the preceding year, and yet England had to pay between four and five millions sterling more for the reduced supply. He would then put to his audience a most serious and important question,—What was to be done with the two millions of people who depended directly upon the cotton trade for their daily bread, if anything should occur to cut off the supply of cotton from America for one year? Our only hope lay with British India, where it had been shown that an immense tract of country existed that had been proved to be capable of supplying any quantity of cotton suited to the purpose of our manufactures, and at one-third the average price paid to America. There also a free population existed, that from time immemorial had been growers of this commodity, who would be glad to work at one-sixth of the daily sum that a slave in America cost his master. In support of this, the evidence of gentlemen who had resided and held high civil and military appointments in India, for periods of from ten to forty years was given, and samples of excellent short staple cotton were shown that had been grown in Darwhar and Coimbatoor, which a gentleman in the civil service of the East India Company had lately stated in Manchester could be grown in any quantity, and be delivered in Liverpool at 2d. a pound. This has been the natural price for sixty years past, although we had paid during that period 1s. 10d. a pound for such cotton; and in the years 1845, 1846, and 1847, it was proved, in evidence before a Committee of the House of Commons, that we had paid 14,557,842*l.* more for our supply of cotton from America than the same quantity from British India would have cost us, even had we paid 3*d.* instead of 2*d.* a pound for it. These, Mr. Warren contended, were serious matters for the consideration of a commercial people.

Mr. Warren commenced his second Lecture by directing attention to the fact, that the part of the world now called British India was the original seat of the cotton manufacture. He showed from the writings of travellers and historians—from Herodotus, 445 B.C., down to the Rev. William Ward, late a missionary at Serampore—that the inhabitants of that country were eminently skilful in the cultivation, manufacture, and colouring of cotton; and that rude and simple as their manufacturing operations have always been, and still are, they till lately maintained their superiority against the whole world; and even now stood unrivalled in some departments of their trade. The early history of the cotton trade of this country was glanced at, and evidence given to show that 119 years after its first mention as a trade, its entire value did not amount yearly to half a million sterling. The new era of mechanical progress then began to dawn—before entering upon which Mr. Warren gave his audience evidences of the condition of the people, as deduced from their houses, clothing, food, the price of corn, the rate of wages, the state of the roads, means of communication, condition of the great sea-ports, agriculture, rent of land, sanitary arrangements, population, literature, and mortality. The progress of the inventions affecting the cotton manufacture was then systematically traced from 1738 to 1790; during which period the principles upon which manufacturing machinery should be constructed were laid down by Kay, Wyat, Paul, Butler, Kay, jun., Highs, Hargreaves, Lees, Wood, Crompton, Cartwright, and Watt; the respective inventions of each were specified in chronological order, and the peculiarities of each invention were explained and illustrated by the model machines before alluded to. The process of manufacture was then entered upon, some of the preparing machines being set in motion. Cotton, the audience were informed, was not quit or freed from its seed in this country (as they had seen it done on the previous evening); but this operation was conducted on the spot where it grew; it was then pressed into bags, so that when it reached the manufacturer the fibres were pressed close upon each other, and in all directions, whereas they were required to be parallel to each other. The first process in this country was to open or separate the fibres by passing them through the "beaten" or "blowing-frame," the operation of which was explained. On emerging from this machine the cotton was found to be deprived of a large portion of the dirt that had been allowed to remain with it, and it was then lightly wound upon an iron roller in front of the machine, forming something like a sheet of wadding. This sheet of cotton was then transferred to the "feed-cloth" of the "carding engine." On this machine being set in motion, the cotton was in a few seconds seen to issue from it in the shape of a continuous "sliver," or ribbon. While this was going on, Mr. Warren explained the old method of making a "sliver;" by which it appeared that with much labour the operator could only get one sliver of some twelve or fourteen inches in length, at the utmost, and then had to keep joining them as they were used; while by this process they could be produced, literally, miles in length. The fibres then required to be laid still more parallel, and to accomplish this the sliver from the carding engine had to be passed several times through the "drawing machine."

The operation of this machine consists in drawing out or lengthening the sliver from 1 to 64; and therefore to maintain its bulk, it is necessary to increase the number of slivers in the same proportion. The machine was set in motion and the process explained, and on the cotton leaving the last "head" of the "drawing frame," it nearly resembled silk. The fibres having now been brought to a proper state of parallelism, the "sliver" is placed at the back of the fourth machine, or "roving frame," the duty of which is to take this frail stream of cotton fibres, which may be easily blown asunder, and make it into a soft thread; then to deposit that thread upon a brass bobbin with the utmost regularity, regulating its own speed in certain parts, so as to maintain an even twist throughout the length of the thread. The bobbin on which the thread is wound, is constantly increasing in diameter; it rises and falls to receive the thread, marks its own progress, and when it has done enough throws itself out of gear.

The means by which all this is brought about were popularly explained; and Mr. Warren concluded by observing, that his audience would probably be inquiring in their own minds the reason why Arkwright's inventions were not spoken of. The only one he (Mr. Warren) could assign was, that to the best of his knowledge and belief (and he had been at some trouble to get at the facts of the case) Arkwright never did invent anything, or lay down any one principle upon which our cotton machinery was constructed. It was true that Arkwright had patented several inventions as his own; but it was also true that in courts of law he was proved to have pirated not only the ideas of the real inventors, but their drawings, models, and tools also. These were facts well known and attested; and it was painful to find men of learning and ability so far forgetting the duty they owe to the less-informed part of the world, as to write the history of great facts, about which they either knew nothing, or were prepared to sacrifice truth rather than be at the trouble of seeking it. Nor was it creditable to the country, and more especially the trade, that has so immensely benefited by the genius and perseverance of the truly great men whose names and inventions had been given, that they should so easily allow the very fame of their benefactors to be pirated. It was to be hoped that the time would come, when some of the gratitude that was due from the country to these founders of its true greatness would be shown in such a way as would gladden the hearts of their descendants, some of whom he (Mr. Warren) had the honour to know; to whose "sense and worth" he could proudly bear his humble testimony.

On Tuesday, Friday, and Saturday mornings, Mr. Warren met the students of King's College School, and the Natural History and Chemical Classes of the City of London School, and delivered addresses on the Progress of Manufacturing Art, as illustrated by the Cotton Manufacture. Some of the more prominent mechanical inventions and chemical adaptations in our manufacturing processes were pointed out, and the advantages the world derived from their practical application was dwelt upon, as was also the great facilities enjoyed by the present over the past, for arriving at correct conclusions on subjects of general interest, and acquiring an extensive knowledge of men and things; and the students were earnestly exhorted to lose no opportunity of availing themselves of these facilities and advantages, so that when it came to be their turn to take a share in the governing and conducting of the affairs of this great commercial country, they might be enabled to do so wisely and well. These addresses occupied two hours each in the delivery, and were received with deep interest by the pupils.

## THE POST-OFFICE IN THE UNITED STATES.

THE following facts have been gleaned from the Report of the Postmaster-General of the United States, for the fiscal year ending June 30th, 1852, showing the growth and condition of that important department.

There existed in the United States, at the above date, 6,711 mail routes, their aggregate length being 214,284 miles; comparing these figures with those of the preceding year, there appears an increase during the twelve-months of 17,994 miles of mail routes, and of 5,713,476 miles of actual distance traversed by the mail. While the comparison with 1842 informs us that the distance travelled by railway and steam-boat has increased upwards of 13,000,000 miles, or 174 per cent. in ten years.

The increase in Ocean Postage service from its commencement, in 1847, is shown by a table of its cost for each year. In 1848, only 100,500 dollars were expended on this service; whereas in 1852, the outlay amounted to 1,896,250 dollars.

The reduction of the rates of postage which came into operation at the commencement of the year to which the Report refers, caused a diminution of little more than 22 per cent., being a very much smaller reduction than occurred during the first year of Penny Postage in this country. The Official Report draws special attention to this loss of revenue, deals a sly blow at the "sanguine advocates of cheap postage," but touches most cautiously upon the increased income which must flow in a few years from the growth in the number of letters. This official caution does not, however, lead to a condemnation of cheap postage, but, on the contrary, the Postmaster-General says, "All experience warrants the expectation, that as a community becomes accustomed to cheap postage, written correspondence will increase. From this cause, and from the rapid growth of the country in population and business, the receipts of the Department must ultimately exceed its expenses, and enable it to refund to the Treasury the sums advanced. In the mean time, the appropriations made from the Treasury in aid of the Post Office establishment, may be deemed safe and beneficent investments for the advantage of the *whole people*, each one of whom, even if not engaged in business correspondence, has a deep interest in the diffusion of intelligence, and the promotion of social intercourse."

The Postmaster-General complains that arrangements have not been made for the exchange of a closed mail with France *viâ* England, in consequence of the British Government insisting on a transit postage of twenty-four cents. (one shilling) per ounce; and says that France is inclined to enter into a treaty with the United States, independent of this country, by means of a union line of mail steamships direct between New York and Havre. This passage shows the impolicy of our present high rates of Ocean postage, and the necessity for at once laying the foundation of a cheap system of international postage, which shall permit the transmission of mails, closed or open, throughout all civilised countries, with the greatest possible facility and at the smallest possible cost. Correspondence is the very breath of commerce, and that country will be the greatest gainer which is most liberal in arrangements for its circulation.

The number of letters passing through the post-offices of the United States, during the year, was under 96,000,000, being less than a quarter of the number passing through our own Post-office; while, on the other hand, the "newspapers and other packages of printed matter, *chargeable with postage*," amounted to very nearly 88,000,000; and 27,000,000 more passed free of postage.

The Report notices the proceedings of the Postage Association in London, says that the object at which it aims is very desirable; but that, in the imperfect state of our foreign postal arrangements, it is deemed inexpedient, at present, to enter upon any new experiment. This latter part seems a *non sequitur* to the former. It might be argued, from the admitted imperfection of the present system, that the necessity for doing something as soon as possible is proved; and that such will be the opinion of the Legislature when the matter is fairly placed before them, is fully believed.

The Postage Association is now in full operation, and a Deputation from the Council and City Committee is appointed to wait upon Lord Canning, the Postmaster-General, at Three o'clock this day.

## PROCEEDINGS OF INSTITUTIONS.

HALIFAX.—The Half-Yearly Meeting of the members of the Mechanics' Institution, was held on Tuesday, the 21st ult., James Stansfeld, Esq., Vice-president, in the chair. The Report presented an outline of those operations which were more strictly educational, and which were considered to be the primary and legitimate objects of all such Institutions. The library, it appears, now consists of 3,577 volumes, and the issue during the half-year, amounted to 6,720 volumes. The classes for reading, writing and arithmetic, grammar, drawing, and French, have been well attended. The news and reading-room has been supplied with six daily London papers, twenty-two weekly and other local papers, five quarterly reviews, and eighteen magazines and serials. The small attendance at lectures is attributed to the many facilities now afforded for gaining miscellaneous information. The number of members is 502—of subscribers, 239—making a total of 741; showing an increase of sixty-four during the half-year, and of 113 during the year. The treasurer's statement of accounts shows an expenditure of 354*l*. 11*s*. 2*d*.; to meet which there was an income of 356*l*. 15*s*. 1*d*.; but as there was a balance owing last year, of 161*l*. 6*s*. 11*d*., there still remains a debt of 159*l*. 1*s*.

SOUTHAMPTON.—On Wednesday evening, a Lecture was delivered at the Polytechnic Institution, on "Books," by the Rev. J. W. Wyld. The lecturer carried his audience back to the period when the rude hillock or unsightly stone erections were the unmeaning records of some important event or distinguishing achievement. He then gradually conducted them through the successive eras of literary progress, including the leaf, skin, and manuscript, until the mighty lever of intellectual power—the Printing Press—appeared upon the stage of human enterprise. The secret of success or failure among authors was clearly developed, and a well-timed satirical rebuke levelled against brainless writers and presumptuous pamphleteers. The lecture abounded with interesting literary statistics, beautifully interwoven with originality of thought, great truths, and practical comments; and at its close the lecturer was awarded a cordial vote of thanks by the audience.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

A neat Case, for holding the Numbers of the Journal for half a year, is now ready, and may be had of the Publisher, 186, FLEET-STREET, price 1s. 3d.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

*Special Prize.* J. S., Islington.—The Special Prize offered by the Society, for the best Essay on the History and Management of Literary, Scientific, and Mechanics' Institutions, is open to general competition, and is not in any way restricted to the Members of the Society of Arts. The length of the essays is entirely left to the competitors themselves. Rejected communications will be returned to the authors, if applied for.

## QUESTIONS FROM CORRESPONDENTS.

*Dyes for Colouring Wood.*—What simple indelible dyes will best colour wood, red, blue, green, and yellow? The colours to be good and easy of application, as logwood is, by an infusion being made of it, in which what is to be dyed is steeped. [No. 44.]

*Birdlime.*—Can you tell me how birdlime is made, what is the process adopted in its manufacture, and where is it chiefly carried on? [No. 45.]

*Coating for Water Tanks.*—Can you inform me of the cheapest and best composition to be used for coating the insides of wooden cisterns or tanks, for containing water, that will add to their preservation, and will not become decomposed or peel off by exposure to the atmosphere? [No. 46.]

*Anti-Corrosive Paint.*—Can any of your readers give me the name and address of the manufacturers of the "Anti-Corrosive Paint?" A. T. [No. 47.]

## MISCELLANEA.

NEW OIL.—A valuable oil obtained from the seeds of the *Aleurites triloba* or *Lumbang*, has recently been introduced into commerce; its applications to various economical uses having been patented by Mr. G. F. Wilson. The kernel of the Lumbang or candle nut, has long been used by the natives of Manilla as a source of artificial light; it contains nearly 50 per cent. of a clear colourless oil. The kernels being divested of their hard outer coverings or husks, are strung upon rushes, and thus form rude candles, which are used by the fishermen.

MUSEUM OF ORNAMENTAL ART, AT MARLBOROUGH-HOUSE.—The numbers attending, &c., during the month of February, were as follows: 4,286 persons on the public days, and admitted free; 967 persons on the students' day, and admitted as students on the payment of 6*d*. each, besides the registered students of the classes and schools.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 23rd Feb., 1853.*
73. Scinde (Meer Ali Morad)—Papers.
139. Ordnance Estimates.
144. Bills—Sheriff Courts (Scotland).
146. „ —Metropolitan Improvements (Repayment out of the Consolidated Fund); Prisons (Scotland)—Seventeenth Report of Inspectors, Part IV.

*Delivered on 24th Feb.*
106. Population, Inhabited Houses, Electors, &c.—Return.
132. Auckland Islands—Correspondence.
147. Bills—Slave Trade (New Granada).
148. „ —Slave Trade (Sohar, in Arabia.)
153. „ —Office of Examiner (Court of Chancery) amended; Mr. Harwood (Arrest by the Austrian Authorities)—Correspondence; International Copyright (Prussia)—Accession of the Dukes of Anhalt to the Convention.

*Delivered on 25th Feb.*
87. Postal communication, &c. (India)—Return.
151. Canterbury Election—Minutes of Evidence.

*Delivered on 26th and 28th Feb.*
125. New Churches—Return.
135. Poor Relief—Returns.
140. Paupers, &c. (Ireland)—Return.
145. Bank of England—Annual Accounts.
152. Lancaster Borough Election—Minutes of Evidence.
76. Sugar-growing Colonies (Jamaica)—Return, Part II.
160. Clergy Reserves (Canada) Act—Opinions of the Judges.
163. Committee of Selection—First Report.
165. Coffee and Chicory—Treasury Minute.
159. Bills—Court of Common Law (Ireland), amended.
161. „ —Inland Revenue Office.
162. „ —County Election Polls (Scotland).
169. „ Commons Enclosure, No. II.

*Delivered on 1st March.*
104. National Gallery—Return.
119. Screw Steamer, "Greenock"—Copies of Reports.
150. Poor Rates (Clare)—Return.
165. Coffee and Chicory—Treasury Minute (a corrected copy).
167. Bill—General Board of Health (as amended in Committee, and on consideration of Bill as amended).

*Delivered on 2nd March.*
131. Metropolitan Police—Accounts.
142. British and Foreign Postage—Table.

155. Courts of Law and Equity (Ireland)—Return.
157. Queen Anne's Bounty—Account.
158. Letter-carriers—Memorials.
173. Clergy Reserves (Canada)—Returns.
174. Clergy Reserves (Canada)—Return of Number of Acres unsold, &c.
175. Clergy Reserves (Canada)—Bishop of Quebec's Letter, &c. &c.
154. Bill—Public-houses (Scotland).

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 25th Feb.*, 1853.

*Dated 8th Jan.*, 1853.

57. W. Henderson—Manufacture of sulphuric acid and copper from copper ores, &c.

*Dated 28th Jan.*

218. T. S. Prideaux—Manufacture of iron.

*Dated 31st Jan.*

255. E. Leach—Preparing and spinning wool, &c.
258. F. Lawrence, W. Davison, and A. Lawrence—Improvements in steam-engines, &c.

*Dated 3rd Feb.*

290. T. Spiller and A. Crowhurst—Propelling.

*Dated 10th Feb.*

351. W. J. Curtis—Improvement in candlesticks.
355. W. Fulton—Finishing textile fabrics.
357. W. Ball—Machinery for looped fabrics.
359. R. Ash—Stopping bottles, &c.
360. G. Hutchinson—Treating oils, &c.
361. C. Breese—Ornamenting papier mâché, &c., with gold.
363. W. Potts—Improvements in sepulchral monuments.

*Dated 11th Feb.*

364. R. Thomas—Machinery for planing, slotting, &c.
365. Sir J. Murray—Deodorising cod-liver oil.
366. A. Sanguinède—Improved clasp or buckle.
367. W. Choppin—Improvements in locks.
368. R. D. Rea—Improvements in bits.

*Dated 12th Feb.*

369. T. R. Mellish—Closing scent and other bottles.
370. J. F. Stanford—Draining, &c.
371. G. Winiwarter—Improvements in fire-arms.
372. T. J. Perry—Construction of cornice-poles, picture and curtain rods.
373. G. Parry—Blast furnaces.
374. G. H. Bursill—Separating gold and other metals, &c.
375. G. L. Lysnar—Swivel hooks, &c.
376. W. Pidding—Crushing ores, &c.
377. W. Pidding—Purifying, decolorising, &c., oleaginous or gelatinous substances.
378. C. Hadley—Communication between guard and driver, &c.

*Dated 14th Feb.*

379. W. E. Newton—Apparatus for veneering. (A communication.)
380. C. J. Burnett—Driving machinery by water.
381. P. A. de Fontainemoreau—Treating fibrous substances. (A communication.)
382. P. A. de Fontainemoreau—Giving flexibility to beds, sofas, &c. (A communication.)
383. P. A. de Fontainemoreau—Tiles for roofing.
384. J. A. Gervais—Treating fermentable liquids.
385. F. C. Monatis—Improved mode of raising water.
386. C. J. Lambert—Preparation of bread and biscuits.

*Dated 15th Feb.*

387. W. Clark—Colours and paints.
388. J. Bethell—Obtaining copper and zinc from ores. (A communication.)
390. B. Greening—Machinery for making fences, &c., of wire.
391. T. W. Kennard—Improving draft of chimneys.
392. F. Chinnock—Securing axles in their boxes.
393. G. Stiff—Manufacture of paper.
394. A. Nicole—Rotary engines.
395. A. R. le Mire de Normandy—Articles made of gutta percha. (Partly a communication.)
396. W. B. and G. S. Whitton—Sewer and other pipes.
397. J. and A. Risdale—Ships' side-lights, scuttles, or ports.
398. H. Dircks—Sewing-machine.
399. H. Francis—Instruments for cutting, wool, hair, and vegetable matters.

*Dated 16th Feb.*

400. H. S. Ludlow—Removing dust, &c., and separating superior and inferior grains in wheat, barley, and malt.
402. B. Cook—Apparatus for lighting fires.
406. E. Sy—Improvements in bookbinding.
408. C. Sheppard—Improved stove, and apparatus for heating air for blast purposes.
410. A. V. Newton—Manufacture of printing surfaces.

### APPLICATION WITH COMPLETE SPECIFICATION FILED.

429. N. Dutton—Manufacture and application of dowels, and machinery for same, partly applicable to other purposes. 18th Feb., 1853.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 26th Feb.*, 1853.

74. Christopher Kingsford, of 18, Buckingham-street, Adelphi—Machinery for solidifying peat, coal, and other substances of a like nature.
87. Robert Robertson Menzies, of Glasgow—Improvements in the manufacture of carpets and other fabrics.
172. John Jobson, of Litchurch—Improvements in manufacturing moulds for casting metal.
179. Frederic Newton, of Fleet-street—Improvements in the apparatus to be employed for producing photographic pictures.
672. Stephen Carey, of Great Guildford-street, Southwark—Improvements in the construction of viaducts, arches, bridges, and other buildings, upon a non-expansion principle.
941. Thomas Collins Banfield, of 18, Queen-square, Westminster—Improvements in the process and apparatus for extracting saccharine and other juices from beet-root or other roots and plants (A communication.)
1192. Archibald Douglas Brown, of Glasgow—Improvements in the construction of portable articles of furniture.
12. Edme Augustin Chameroy, of Paris, France—Improvements in motive-power engines, and in the application of motive-power to the same.

*Sealed 2nd March*, 1853.

8. Richard Wright, of Greenwich—Improvements in constructing vessels.
135. Robert Griffiths, of Great Ormond-street—Improvements in apparatus for indicating the number of persons entering, and the distance travelled, in public or other conveyances and places, for the prevention of fraud upon proprietors of public conveyances.
210. Henry Webb, of Willenhall, Staffordshire, and Joseph Froysell, of the same place—Improvements in fastening knobs to door and other locks.
447. George Gadd, of Fisher-gate, Nottingham—Improvements in apparatus for roasting coffee.
954. Samuel Neville, of Gateshead—Improvements in the manufacture of lamp-glasses and globes.
1053. Isham Baggs, of Liverpool-street—Improvements in obtaining or extracting gold and silver from their ores.
1086. George Michiels, of 57, Holywell-street, Westminster—Improvements in the purification and manufacture of gas.
1119. Jean Baptiste Moinier, of Rue de Marseille, and Charles Constant Bontigny, of Rue de Flandre, of La Villete, France—Improvements in concentrating syrups and other solutions, and in distillations.
1121. George Beadon, of Creechbarrow, near Taunton—Improvements in constructing and propelling ships and vessels.
1147. George Gwynne, of Hyde-park-square, and George Fergusson Wilson, of Belmont, Vauxhall—Improvements in treating fatty and oily matters.
1160. George Michiels, of 57, Holywell-street, Westminster—Improvements in the manufacture of gas.
1180. William Busfield, of Bradford, York—Improvements in apparatus for combing wool and other fibrous substances requiring like process.
1206. Robert Taylerson, of Three Indian King's-court, Newcastle-upon-Tyne—Improvements in ship-building.
5. Joseph John William Watson, of Old Kent-road, and William Prosser, of Adam-street, Adelphi—An improved method of manufacturing steel, and of carburizing iron.
11. John Bleackley, jun., of Myrtle-grove, Prestwich—Improvements in machinery used in washing, bleaching, dyeing, and sizing yarns and fabrics.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Feb. 25 | 3427 | Improved Parasol Joint | Hargrave, Harrison, and Co. | 13, Wood-street, and 1, Clement's-court, Cheapside |

# SOCIETY OF ARTS.

FRIDAY, MARCH 11th, 1853.

## THIRTEENTH ORDINARY MEETING,

*Wednesday, March 9th,* 1853.

The Thirteenth Ordinary Meeting of the Society was held on Wednesday, the 9th inst., Henry Cole, Esq., C.B., in the chair.

The following were elected Members:

Beaumont, Wentworth Blackett, M.P., Bywell Hall, Newcastle-on-Tyne.
Clive, the Venerable Archdeacon, Welshpool.
Cunliffe, Edward, Highbury-place.
Duffield, William Ward, Chelmsford.
Ellis, William, Champion-hill, Camberwell.
Hutt, William, M.P., Gibside, near Gateshead.
Jenour, Harry James, 2, Field-court, Gray's-inn.
Sherriff, John William, Ludgate-street;

and the names of eight candidates for membership were read.

Mr. William Stones, of Queenhithe, read a paper, "On the Materials and Machinery Employed in the Manufacture of Paper."

The author stated, that however interesting it might be to trace the history of writing materials, the time allotted for the reading of the paper would not allow of more than a very slight notice of the substances upon which the ancients were accustomed to record their thoughts.

These were:—Stone, as in the instance of the law of Moses; Metal—Pliny stating, "At first men wrote on palm-tree leaves, and afterwards on the bark or rind of other trees. In process of time public monuments were written on rolls of lead, and those of a private nature on linen, books, or tables covered with wax." Parchment,—the manufacture and use of which are mentioned by Josephus, Diodorus Siculus, and other authors, and from its name Charta Pergamena (paper of Pergamus), it is highly probable that its mode of preparation was improved, or its manufacture and use more general there than in other places,—parchment is especially mentioned by Paul; Ivory—such tablets were in use by the rich Romans; Wood—from an early period this substance has been used, as we find Moses is enjoined to "Take of every one of them a rod according to the house of their fathers, twelve rods, write thou every man's name upon his rod;" and in Ezekiel, "The sticks whereon thou writest shall be in thine hands;" wooden tablets were not disused in Western Europe until the fourteenth century. They were in general covered with wax, and the writing was executed with styles which at one end were pointed for the purpose of inscribing the letters, and smooth at the other for erasing.

A specimen of waxed paper, in present use amongst the Arabs, was exhibited, and also the model of a frame, as used by the ancient Britons, who cut their letters upon sticks which were most commonly square, but were sometimes formed into three sides; consequently a single stick contained either three or four lines; several of these sticks were fitted together in the same frame.

Leaves of Plants;—in the British Museum and the Library of the East India House, there are many manuscripts written on leaves of plants in the Sanscrit and other languages; the common books of the Burmans are composed of the Palmyra leaf. The only attempt at manufacture in the ordinary sense of the word was in the case of the Papyrus, commonly, but incorrectly, said to have been prepared from the leaves of the plant, but really obtained by separating the thin plates of cellular tissue which lie just beneath the exterior of the stem, those nearest the centre being esteemed the best. The quantity made by the Egyptians must have been enormous, judging by the number of rolls frequently found in the tombs, and from the manuscripts dug out of Herculaneum.

It is highly probable that the manufacture of paper from pulp was first invented in China, about the commencement of the Christian era; and was thence brought to Mecca along with the article itself in the beginning of the eighth century, whence the Arabs carried it, in their rapid career of conquest and colonization, to Spain at the end of the ninth, or beginning of the tenth century.

The first paper mill in Germany was established at Nuremberg, in 1390.

In our own country the earliest trace of the manufacture occurs in a book printed by Caxton, about the year 1470, in which it is said of John Tate;

> "Which late hathe in England doo make thys paper thynne,
> That now in our Englyssh thys booke is prynted inne."

That it was considered worthy of notice of Majesty, is evident from an entry in Henry VII.'s Household Book: "25th May, 1498. For a rewarde geven at the paper-mylne, 16. 8." Again, 1499: "Geven in rewarde to Tate of the Mylne, 6s. 8d."

A German jeweller in the service of Queen Elizabeth, erected a mill at Dartford, about the year 1588, and so important was the matter esteemed that the proprietor was knighted by that Queen, and the extent of the operations may be judged from the remarks of a poet of the time:

> "Six hundred men are set at work by him,
> That else might starve, or seek abroad their bread;
> Who now live well, and go full brave and trim,
> And who may boast they are with paper fed."

The author observed, that the manufacture did not appear to have been successful, and quoted the remarks of Fuller, who, in his "Church Worthies," after describing the various peculiarities of paper made by different nations, lamented that in Cambridgeshire the paper-mills had been stopped, and strongly urged a renewal of the business.

After this, the making of paper appears to have been revived, as it is spoken of by Addison in the "Spectator," No. 367, May 1, 1712, as one of the established national industries. He remarks, in reference to paper-mills, that by their means "the whole nation is in a great measure supplied with a manufacture for which, formerly, she was obliged to her neighbours."

Having given this historical sketch of the subject, the following statistics of the present state of the manufacture were furnished:—Paper-mills in England, 327; in Scotland, 51; and in Ireland, 37; of which there are at work, 304 in England, 48 in Scotland, and only 28 in Ireland. Paper charged with duty—

| | England. | Scotland. | Ireland. |
|---|---|---|---|
| | 105,712,913 lbs. | 28,600,019 lbs. | 6,719,502 lbs. |
| Duty, | £693,741 | £187,687 | £44,096 |

Paper exported—

| | England. | Scotland. | Ireland. |
|---|---|---|---|
| | 6,568,268 lbs. | 1,040,555 lbs. | 9,248 lbs. |
| Paper-hangings | 1,155,012 sq. yds. | 161,164 sq. yds. | |
| Drawback, | £43,234 | £6,946 | £60 |

The duty being 925,524*l.*, the annual value of paper manufactured in this country cannot be less than four times that sum, or 3,702,096*l.*, the average value of paper being estimated at 6*d.* per lb. With an annual production of nearly four millions, and an export trade of a quarter of a million, capable of vast extension, the paper manufacture must be regarded as an important branch of the national industry.

The materials employed in the manufacture, came next under consideration. Brief reference was made to the mode of manufacturing paper in China, whence our India paper is derived. The paper of the Chinese is principally made of bamboo, the younger stalks being preferred. The bundles are thrown into a reservoir of mud and water, and buried in the ooze for about a fortnight to soften them; they are then taken out, cut into pieces of a proper length, and put into mortars with a little water, and pounded to a pulp with large wooden pestles. The semi-fluid mass, being cleansed of the coarsest parts, is transferred to another vessel, into which the workman dips his mould, which is constructed of bamboo in small strips, rounded and smoothed. The so-called rice-paper is not truly a manufacture, but is obtained from a small plant, whose stem is cut spirally round the axis into a thin lamina, which is then unrolled and flattened out by pressure. Its character as a cellular tissue may be easily shown by magnifying a portion of it.

Linen, or materials made of flax, either in the state of new pieces or old fabrics, is particularly valuable for the strength which it imparts to the manufactured paper. In addition to the home supply, large quantities are annually imported into this country from Germany. Cotton is too valuable in its state as imported to be used in this manufacture, and is generally obtained from old white or printed goods. Cotton rags are also imported from the Continent. Flax and cotton waste, also used very largely, are the portions of the raw materials not available for being made up into woven fabrics. Hemp, or rope in the untarred state, is a very valuable material; when tarred it is used for brown paper principally. Specimens of paper from the plantain were exhibited, as also of wood; and the author remarked that the idea of making paper from wood pulp was not new, and that two patents were taken out in 1852 for different processes of preparing such pulp; nevertheless, this kind of raw material had not been brought into any extensive use. It was observed that any fibrous vegetable substance,—as the inner bark of trees, the stalks of the nettle, the tendrils of the vine, the bine of the hop,—might be used; but that up to a very recent period no material had been found to answer so well as linen, hempen, or cotton rags. Woollen cloth or silk could not be beaten into a suitable pulp; wool particularly giving a hairy texture to the surface. Lately, however, straw had been made available in the manufacture of paper; and the specimens exhibited showed that ere long it would, if it had not already, become a formidable rival to the old-established materials.

With reference to some of the materials named, the great objection to their use appeared to be the cost of carriage from the countries of their abundance. Whether the establishment of bleaching-houses, and the reduction of the crude article into half stuff in its native haunts, would answer as a commercial speculation, was an open question. In a sanatory point of view, as tending to destroy miasma, the erection of such factories might be beneficial.

Other materials, used in various combinations—many of them for the production of coloured paper, of which specimens were exhibited—were then passed rapidly in review; and the want of a standard work on colour-making, founded on correct theory and actual experiment, demonstrated.

The actual processes in the manufacture were next brought before the meeting. It was urged that the subject of water power deserved much more attention than it at present received,—paper-mills being generally situated on small streams, liable to considerable variation in the quantity of water. It was therefore of the first importance, that the mode of applying the force of the stream when at its minimum should be such as to secure the most effective result. Most of the paper-mills in this country use the common undershot wheel. Many of them during dry seasons work only half time, and even less, or, which is equivalent, prepare material for half the vats only. It was suggested that the form of the wheel might in many instances materially influence the quantity of work done. The importance of the question was increased by the consideration of the fact, that all improvements in draining land tend to the occasional decrease of water supply to the paper manufacturer. An inquiry into the best form of water-wheel—whether undershot, overshot, or turbine—with an account of the depth of the fall, and effective per-centage, was very desirable.

The operations of cutting the rags into shreds, their subsequent dusting in machines, and the boiling in an alkaline ley for the purpose of cleansing the material were described; the best means of boiling being considered that in which the rags are placed in a vessel revolving upon side pivots where the steam enters, the boiler revolving three or four times every hour. Rags, after these manipulations, are subject to the further process of comminution in a machine termed an Engine; the object being obtained by causing the rags to pass between a series of fixed blades or cutters, and a series of blades attached to a revolving cylinder. The distance between the fixed and moving blades is capable of adjustment by elevating or depressing the bearings upon which the shaft of the cylinder reposes; and the cylinder is raised or lowered by a screw, and caused to cut coarser or finer by enlarging or diminishing the space between the fixed cutters in the block and those in the cylinder. The engine is supplied with a constant stream of water, regulated by a stop-cock, and when a supply of water and rags has been introduced into the engine, the water is thrown into a current by the motion of the roll, and the rags are drawn between the teeth of the roll and those of the plate. The continual revolution of the water and rags causes the latter to be thoroughly washed, and by lowering the roll gradually nearer to the plate the rags are cut, torn, and chopped to pieces. A very important improvement for effecting the grinding and washing rags was here described, consisting of the introduction of a second roll placed behind the first, and made to revolve more rapidly than the first, and from its position the rags are thrown upon it by the first in an opened-out condition, whereby it acts upon every fibre; whereas in the ordinary engine they go in before the roll in large wedge-like masses, and a great deal of the power is consequently lost. An entirely new system of washing apparatus is adapted to this engine, and consists in making certain parts of the engine hollow, covering such openings with woven wire or perforated metal. Through these wired surfaces and perforated plates the dirty water passes into the recesses, and thence by two or more pipes into a receptacle; slides are attached to the ends of the pipes and alternately opened and shut. By these means the stoppage of the flow in the pipes causes a cessation of suction through the wires and perforated plates, and if any fibres of rags have been drawn into the interstices of the wires they are drawn out and carried forward in the engine by the flow of water and pulp over them; and thus the straining surfaces, or perforated plates, are kept clean.

After bleaching, which is effected with chlorine, the material is subject to another grinding, until finally reduced to fine pulp. The preparation of pulp is the same, whether the paper is intended to be made by hand or machine. The process of making by hand was briefly described. The pulp, being sufficiently ground, is allowed to flow into a vessel of stone, and kept moderately warm by means of a steam-pipe, and continually in motion by a wooden agitator; from this vessel the maker collects on a frame, covered with wire-gauze, the desired quantity of pulp, and by a gentle shaking motion compacts the material into paper, the water draining through the wire. The formation of the mould determines whether the paper shall be what is termed laid (ribbed) or woven.

By the aid of a large diagram, the author exhibited the various trade-marks inserted in paper as distinguishing symbols; and showed how some of our names,—as Foolscap, Hand, and Pott,—are derived from the water-marks of the early paper-makers. The insertion of intricate water-marks being justly considered an important method of giving security to commercial documents, many improvements had of late been effected; some of which were pointed out, and specimens of the various modes exhibited, both in outline and light and shade.

A number of sheets being made, the water is expressed and the paper hung up to dry, after which it is saturated with size. The superfluous size being pressed out, the paper is parted and slowly dried; the size thus thoroughly penetrates the paper.

The mode of making paper by machinery was illustrated by a diagram, and a model of the first machine erected in this country, and the passage of the wire through the knotter, or strainer, on to the continuous wire to the continuous felt, and thence on to the drying cylinders, was explained. The author observed, that the principle of the continuous wire and felt, and the shaking motion, had been retained in nearly all machines up to the present time. He then proceeded to describe; 1st. The various modes of separating the knots and lumps from the pulp by means of bars of metal laid close together, and a quick vertical and lateral motion being given to the strainer; the combination of concentric rings of metal with small openings between them, from the 50th to the 100th of an inch wide, the sieve receiving a vibratory motion up and down; the causing the diluted paper-pulp to pass between longitudinal apertures upon the surface of a revolving cylinder; and the passage of the pulp through fine slits cut in a solid metal plate. 2ndly. The different forms the continuous wire had been made to assume, the variation consisting principally in giving the web a cylindrical figure by means of covering a skeleton drum with wire-cloth, and causing the pulp to compact itself on the surface of the wire by the action of air-pumps attached to the axis of the drum. A cheap form of this machine is extensively used in the United States, but is not much used in this country, the horizontal Fourdrinier machine being the one chiefly adopted. 3rdly. The apparatus for compressing the pulp. This was formerly effected by perforated rollers upon the surface, but now more generally by the wire-web traversing over wooden boxes, from which the air is partially exhausted by means of pumps, or fans; a jet of steam has also been successfully applied to effect the same object.

After its passage through the sizing apparatus, the web of paper, in order to be cut into sheets, is caused to pass between circular knives which divide the web into narrow strips of standard width. This is easily accomplished; but the necessary cross cut is not so simple an operation, as the progress of the web must be temporarily arrested while the cut is being made, and then the paper be again advanced for a similar length, and so on continuously. Several ingenious plans for this purpose had been devised, one of which was illustrated by a diagram. When sized the paper will bear to be written on; but the surface requires smoothing, which is done in various ways, either by passing the web of paper between rollers heated by steam, termed Callenders, or by placing the sheets, when cut, between zinc or copper plates, and pressing the same in a rolling press; by hot-pressing, or subjecting the sheets to pressure from hot plates of iron, the paper being protected from extreme action by the intervention of glazed boards, — or by causing the sheets to pass separately between a heated cylinder and a solid paper roll accurately ground together. The sheets are then sorted, folded, and packed in reams, consisting of twenty quires, each quire containing twenty-four sheets, weighed by the Revenue Officer, and charged with a duty of 1½*d*. per pound, and five per cent.

Having noticed the principal points of the manufacture, the author referred to the many important interests connected with a large and cheap supply of paper; as newspapers, which, he remarked, were entirely indebted for the position they at present hold in the civilized world, to the conjoint assistance of the paper and printing machines.

It is interesting to trace the corresponding improvement in these two machines, so intimately connected, both being the work of the present century; the advantages of the printing machine could not have been developed had the paper-machine not poured forth its miles of web; and the paper-machine would have experienced little demand for its production, if the printing-machine had not been introduced and improved. They have so run their giant race together, that 300 square feet of paper per minute, and 10,000 impressions per hour, do not excite our wonder, because they are matters of daily occurrence. Nearly twelve millions of copies of the *Times* were issued in 1850, and its daily aggregate printed surface is stated to be more than thirty acres. Five hundred thousand double numbers, or one million of the Wellington number of the *Illustrated News*, had been printed.

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The CHAIRMAN hoped there were some gentlemen in the room, who were prepared with suggestions on the subject of the impediments which prevented the application of paper to many manufactures for which it was suitable. He thought that amongst the impediments which were felt most strongly were the fiscal burdens. When Governments, in raising revenue, meddled with matters of trade, a great many inconveniences invariably followed, and the progress of the manufactures concerned was always arrested. In the matter of glass this had been strikingly illustrated; it was not until Sir Robert Peel removed the fiscal obstructions that its variety of uses were known or developed. Indeed he thought he might safely say that, but for the removal of that tax, it would scarcely have been possible to have had the noble building for the Great Exhibition. The Council of the Society had some time ago sent round circulars to the various Mechanics' and other similar Institutions, for the purpose of gaining evidence as to how far the fiscal restrictions on paper, advertisements, news, and foreign books impeded the growth of intelligence and the spread of knowledge. To these, answers were gradually coming in, stating to what extent the prejudicial influence of these restrictions was felt. He thought that as we now had a ministry in office who were resolved to look to the education of the people, the best thing Government could do would be, to take off the duty on paper. Cheap books appeared to him of even more importance at the present day than the schoolmaster; because they would percolate and make their way into society better. Perhaps the most important question as regarded these fiscal restrictions was the newspaper stamp; at least he would prefer to see it removed in preference to any other, but he should like better still to see all go together. In this Society, they had nothing to do with the question of revenue; that belonged to the Chancellor of the Exchequer. The removal of the impediments to the progress of science and intelligence was their province; and whether the present subject were regarded in a social, religious, moral, or manufacturing aspect, it possessed deep interest, and good must arise from the discussion.

Mr. CHARLES KNIGHT said he was much struck by a circumstance mentioned in the historical introduction to the very interesting Lecture to which they had listened,—he referred to the statement that a Government, so long as three hundred years ago, in the time of Henry VII., bestowed a reward for some improvement to a paper-maker; in the present day, as Mr. Crompton could bear witness, there was nothing of the kind. There was one little circumstance in connection with the manufacture of paper to which he wished to call the attention of ladies,—he referred to the existence, in many even of the best papers, of small black spots on the surface. These were not found in old papers, they were confined to those of modern manufacture, and arose from the use of braid containing india-rubber, now much in use in ladies' dresses, and of which, in picking the rags, it was impossible entirely to get rid. What he wished more particularly to direct attention to, was the larger black spot of the Excise duties. In illustration he might be pardoned if he referred to the manufacture of books,—a class of manufacture of which paper was the raw material. He believed there was no other instance in this country in which there was a tax of 25 per cent. on the raw material of any manufacture; yet this was the case with paper. Take a pound of paper at 7½*d*., which was a fair average price for printing paper, the duty was 1½ and 5 per cent., amounting in all to about 25 per cent. This was a tax which every one must admit was exorbitant and atrocious. The argument used to justify this was, that 1½*d*. was but a small addition to the price of a book weighing a pound, say the *Quarterly Review*; but this was not a fair way of meeting the question. Let them take a work like the *Penny Cyclopædia*. If it were necessary to bring out another edition, in order to pay expenses he must print 10,000 copies; each copy would need three reams of paper, say a 20lb. demy, 60lbs. at 1½*d*. would be 7*s*. 6*d*. Well, this might not appear much on a work costing 6*l*. or 7*l*.; but look at the effect upon him—before he could bring out this work to reform and enlighten the people he must pay in paper duty about 4,000*l*. Mr. Knight then proceeded to refer to the arrangements now being entered into between this country and America for an international copyright. He also drew attention to the present vexatious and tedious process of obtaining the "draw-back" on books that were to be exported, characterising it as a most intolerable impediment to trade.

MR. JOHN CASSELL said, that the fiscal enactments on paper had a restrictive influence both on the labour and on the books of the people. For instance, look at the raw material of paper; say it was straw, as they had just seen specimens of paper made from straw; the material was comparatively valueless; it was the labour which gave its value, and the tax was in point of fact a tax of two or three hundred per cent. on labour. Then, as regarded education—not simply the education of the rising generation, but of a vast proportion of the adult population of the country who were uneducated men, but not so much so as to be unable to read—this tax had a most injurious influence. He felt a deep interest in the education of this class, having belonged to it himself; and about twelve months ago he resolved to issue a periodical for the purpose of placing within their reach the elements of a complete education. He published for this purpose the *Popular Educator*; and as an illustration of the desire amongst the working classes for education, he might remark that the average circulation of this Magazine was 75,000 weekly. For issuing this penny periodical with a view to the elevation of the people, he had been taxed during the year to the extent of 1,385*l.* 15*s.* Other works of a similar description were, of course, taxed in like manner. The shilling *Euclid*, for instance, which he had published in consequence of a hint thrown out by the Society of Arts. Altogether, independently of the *Popular Educator*, he had paid annually 3,500*l.* for paper duty; and if this amount were expended in increasing his means of promoting education, it would be impossible to calculate the amount of good it might effect. In reference to the operation of the "draw-back" in exporting books, he mentioned an instance which occurred the other day, in which the excise-officer refused to seal a parcel of books he was sending off to America, just because he had put the name of an American publisher on the wrappers of the books, in order to secure the copyright. In regard to many other purposes to which paper was and might be applied, he might state that we could not compete with France in the manufacture of paper boxes, because in France they paid no duty on the material. He could not believe that a Free-trade Government would suffer this tax to remain, when it was considered how it pressed on many portions of the industry of the people. He trusted the Society of Arts would continue to prosecute the inquiry on which they had entered, and believed that success would be the result.

**Mr. Varley** offered some observations on the materials from which paper could be made, and spoke of the advantages afforded by the microscope for examining the texture of the materials to be so applied. A great objection to the use of straw was the fact, that not only were its longitudinal fibres so short and brittle, but that between these fibres were large cells, containing much pulpy matter, which prevented the paper being strong and tough.

**Mr. Collett** spoke at some length on the injurious operation of the paper duty, and the heavy outlay necessary previous to the issue of any great work. He contrasted with this the way in which the spirit-merchant was treated, in his goods being permitted to remain in bond until sold. If booksellers had been permitted a similar privilege, Mr. Knight would have been some thousands in pocket. The Chairman had referred to the repeal of the duties on glass; now paper was applicable to more purposes than glass was. Mr. Baldwin, a Birmingham paper manufacturer, had told him that if the duty was taken off, he could make doors of paper much better and stronger than wooden ones. If these duties were removed, an immense saving might be effected by having many operations performed at the place where the paper was manufactured, —a thing which, under present arrangements, was impossible. The circumstance of there only being two places in England—London and Manchester—where paper could be stamped for newspapers, was a practical prohibition to paper-makers at a distance engaging in that department. He believed that if the newspaper stamp were removed, the consumption of paper would be enormously increased; in confirmation of which, he referred to the success which had attended the recent issue of an unstamped paper in the Potteries. The duty prevented publishers paying first-class talent in authorship; and as the people would have periodicals, they now bought the trash which was issued at a low price.

**Mr. Bucknall** remarked, that a common objection to the repeal of the paper duty was, that there was only a limited supply of the material from which paper could be made; and that instead of increasing the quantity manufactured, larger profits would go into the maker's pocket, in case of repeal. The great question was, then, the discovery of new materials suitable for the purpose. To this end, he wished that straw should receive a due amount of consideration. He was aware it might not be possible to use it for the best papers, but still he thought that many of the objections to it might be overcome. He had been favoured by the patentees of the process for its manufacture with specimens in the various stages, which he would place in the hands of the Society.

The **Chairman** proposed a vote of thanks to Mr. Stones, which was carried unanimously.

It was announced that at the next meeting, on the 16th of March, a Paper would be read by J. O. N. Rutter, Esq., "On Warming, Ventilating, and Cooking by Gas."

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## DUTIES ON PAPER, NEWS, &c.

The inquiry which it was announced, in the last Number of the Journal, the Council had determined to prosecute on this subject, has been set on foot; and the following circular has been addressed to the Secretaries of all the Institutions in the United Kingdom as a preliminary measure:

Sir,—Upon a suggestion of the Institutes' Committee, made in the interests of the Institutions in Union with the Society of Arts, the Council have undertaken to prosecute an inquiry as to the operation of the present fiscal restrictions on Paper, Advertisements, News, and Foreign Books, not only as they affect the welfare of the Union, but also in their general bearing on the Arts, Manufactures, and Commerce of the country, which the Society by its Charter is bound to promote.

I am instructed by the Council to invite your attention, and that of the Institution with which you are connected, to this important subject. Any information that you can supply with regard to it will be thankfully received and carefully considered. They desire to bring the accompanying queries under your special notice, to which they will be glad to be favoured with an *early* reply.

I am, Sir,
Your obedient Servant,
Edward Solly, *Secretary.*

QUERIES PROPOSED BY SOCIETY OF ARTS.
March 8, 1853.

1. Has your Institution a News-Room, and how does it answer?

2. What number of—
   London Daily Papers,
   London Weekly Papers,
   Provincial Papers,
   Serials, and
   Quarterlies,
do you take in? and how far does the cost in each class affect the supply?

3. Which class is most sought after by readers, and do any difficulties arise in consequence of the demand for that particular class?

4. Is Local News sufficiently attended to in the local papers; and if not, to what cause is the neglect attributable?

## LECTURES ON THE COTTON TRADE AND MANUFACTURE.

Mr. Warren commenced the third of the above series by quoting Bacon's learned work, "Novum Organon," to show the estimation in which the ancients held inventors, "paying them divine honours," and declaring their inventions to be "new creations, and imitations of the works of the Deity;" and by giving an extract from a letter of Sir Isaac Newton to Cotes, in which the superiority of the enlightened over the ignorant workman is clearly defined. He then proceeded to point out the superiority of the present over the old methods by which our manufacturing operations were conducted. The conditions upon which a nation's prosperity could only be secured was dwelt upon, and illustrated by the progress of the cotton-trade in this country. The great necessity for an abundant and cheap supply of raw material was strikingly shown by contrasting the condition of various trades during periods when the raw material was abundant and cheap, with those in which it was limited and dear. The advantages of accumulated capital in conducting industrial operations, and the benefits the operator derived from such accumulations, was popularly shown, and so was the necessity for the exercise of economy on the part of the artizan in the disposition of the wages received in return for his labour; and to the want of these habits of economy, Mr. Warren traced all the great evils which afflicted the operative classes. As the wealth of a nation was regulated not by what was sent out of a country, but by what was brought into it, in return for its exports, so, with every individual working-man, it was not by the mere spending of money, but by what it was spent in—by what was got in return—that his domestic comfort was regulated.

Mr. Warren then took a "roving" from its machine, and placing it in its proper position in the spinning-machine, it was converted into a fine and strong thread, fit for the making of calico, which consisted of "warp" and "weft," interlaced like ordinary basket-work. The "warp" was that part of a piece of cloth which constituted its length; and to make this, the "bobbins" were taken from the spinning-frame and placed in a machine, so that the threads could be wound upon another part of the machine called the "reel," in a spiral form. One traverse of the threads from the bottom to the top of this reel gave the length, and repeated traversings gave the number of threads that were required for the breadth of the web.

When taken from this machine, the warp was shown to have a tendency to curl. To prevent this, it was passed through the next, or sizing machine, which consists of a trough for holding starch made from sour flour and water; and a set of rollers, which can be so adjusted as to press out the superfluous starch, leaving only as much in the warp as will prevent the twisting, or "snarling." They were now ready for the last manufacturing operation—that of weaving; and after explaining the principles upon which a steam, or "power-loom," was constructed, Mr. Warren set one in motion, and wove some calico having a white warp with a pink "shoot," or "weft."

Mr. Warren concluded by speaking of the dignity of industry, and of its civilising influences and power for good. By adding intelligence and high-mindedness to industry, the workman, whether guiding the operations of the plough, the loom, or the council of state, was in a fair way to realise the loftiest conceptions of his nature—to become a blessing, not only to himself, but to his kind; and most earnestly would he (Mr. Warren) appeal to his audience that they should be untiring in their efforts to reach humanity in its lowest depth; for, surrounded though it might be by the mire of moral pollution, there still existed in the breast of man a spark of divinity which might, by the exhibition of kindly affection and true sympathy, be fanned into a holy flame of self-respect, which would make him feel too good for a position so degrading, and cause him to start into new life a better and a happier man.

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On Friday, the 4th inst., His Royal Highness, Prince Albert, the President of the Society, examined the beautiful series of working models with which Mr. Warren illustrated his Lectures on the Cotton Manufacture. Mr. Warren exhibited the various processes which cotton undergoes in passing through the different stages of the manufacture, from the first separation of the fibre from its seed, down to the last operations of the calico-printer. His Royal Highness appeared to be much pleased with the completeness and perfection of Mr. Warren's illustrations.

## COLONIAL POSTAGE.

On Friday a numerous and influential Deputation of the Council and City Committee of the Colonial and International Postage Association waited, by appointment, on Lord Canning, at the General Post-office. Mr. Moffatt, M.P., said that the merchants of London, and the country at large, for a very considerable time, had felt that we had been treating our Colonies very unfairly, in not extending to them the same advantages with regard to postal communication as those enjoyed by the mother country. These views would have been sooner pressed upon the attention of Government, but it had been thought better to wait till the success of the Penny Postage in this country had been placed beyond all question before asking for the extension of that most important measure to our Colonies and dependencies. The merchants of London wished to see not only a reduction of the rates of Colonial Postage, but they also wished for the establishment of one uniform rate, so that a letter to Scilly and a letter to Bombay should cost the same; and that uniform rate should be very low. This view was supported by the Lord Mayor. Other gentlemen of the Deputation spoke to the influence a reduced postal rate would have in putting a stop to evasions; to the advantage it would prove to life assurance companies; and to the benefits that would accrue to all classes of the community, not only to commerce and trade, but also to the increase and development of kindly feelings and affections. Lord Canning replied, that Her Majesty's Government were deeply sensible of the importance of the question; and as a proof of this, he might state, that a communication had been made to those of our Colonies which had the control of their own postal arrangements, proposing to reduce the Colonial postal rates to a uniform charge of 6d., to cover the entire charge from the sender to the recipient. This rate would be divided between the Colonies and the mother country, thus:—If the mother country found the packets, 1*d.* to the mother country, 1*d.* to the colony, and 4*d.* for the ocean transit. If the packets were provided by the colony, then the order would be reversed. In the case of ship letters, the rate to be divided equally between the mother country and the colony, 3*d.* to each. The rate on all newspapers would be 1*d.* His Lordship could not go all the way with the Deputation with regard to the comparison that had been instituted between the working of our inland Penny Postage and the effects it would probably have if extended to the Colonies. He perfectly agreed with the Deputation, that Colonial Postage must be first considered and arranged. With respect to foreign countries, the difficulties were enormous. Negotiations were pending between the Governments of this country, France, Spain, and Holland. It was proposed to make very considerable reductions, and the difficulty was to persuade the Governments of those other nations to come to the same conclusion.

## ROYAL PORCELAIN COLLECTIONS.

In order that the instruction which the public were deriving from the inspection of the Queen's porcelain, at Marlborough House, might not be interrupted, Her Majesty has been graciously pleased to permit a second series of specimens to be made from the collections at Buckingham Palace, and exhibited at Marlborough House. This series is more numerous and varied; and, in some respects, even finer than that recently removed. It consists chiefly of old Indian, of the highest order, and of an extensive series of Sèvres, illustrating the styles of different epochs of that Royal manufactory. Among them will be found a curious *déjeuner* service produced immediately after Napoleon's expedition to Egypt, in which the fitness of porcelain decoration is altogether sacrificed to an affectation of forms and ornaments belonging to the age of the Pharaohs; also, some very fine jewelled cups, and a superb bowl of hard porcelain, which was executed expressly for Louis Seize. Lord Faversham has also sent to Marlborough House some of his turquoise Sèvres porcelain for public exhibition.

## EXHIBITION OF CABINET WORK.

The following notice has just been issued by the Department of Practical Art. The Lords of the Committee of Privy Council for Trade having had under their consideration the desirableness of making a collection of fine specimens of cabinet work for the information of students of schools of art, and the public at large, have directed the Department of Practical Art to collect and publicly exhibit such specimens.

As the space at Marlborough House is now fully occupied by the museum and special classes, permission has been obtained from the Royal Commissioners for the Exhibition of 1851, to use such accommodations as may be afforded by Gore House, Kensington, where the proposed Exhibition will accordingly take place in the month of May next.

The space being limited, it is intended to exhibit only specimens of furniture which have been executed before the present century.

Her Majesty the Queen has been graciously pleased to allow examples, &c., from Windsor Castle, to be placed in the proposed Exhibition, and the loan of fine specimens has been liberally offered by several persons.

Possessors of cabinet work, willing to promote public instruction in this branch of manufacture by lending specimens, are requested to intimate their intentions to the Secretary of the Department of Practical Art, Marlborough House, Pall Mall, London, on or before the 5th of April.

The arrangements for the safe removal and return of any specimens which may be lent to the department have been entrusted to Mr. John Webb, of Old Bond-street.

HENRY COLE.

Marlborough House, London,
5th of March, 1853.

## COLONIAL CORRESPONDENCE.

### NEW BRUNSWICK EXHIBITION.

By the Report of the New Brunswick Exhibition, recently held at Fredericton under the superintendence of the New Brunswick Society for the Encouragement of Agriculture, Home Manufactures, and Commerce, it would appear that the Exhibition has been a very useful and successful one. The catalogue includes upwards of 2,000 entries, and the list of awards contains 46 honorary diplomas, 313 money awards, and a considerable number of "honourable mentions." These awards are arranged in the Report under the following heads:

| | |
|---|---|
| CLASS I.—Mineral Kingdom | Sect. A—Raw Materials.<br>Sect. B—Manufactures chiefly in metal. |
| CLASS II.—Vegetable Kingdom | Sect. A—Raw Materials.<br>Sect. B—Manufactures chiefly in wood.<br>Sect. C—Manufactures from grain, fibres, &c. |
| CLASS III. | Sect. A—Live Stock, &c.<br>Sect. B—Manufactures from parts of animals. |

CLASS IV.—Fine Arts, &c. &c.

The relative importance of these several classes may, to some extent, be judged of from the following list of the Juries:

1. Raw Materials from the mineral kingdom.
2. Grinding and polishing materials.
3. Bricks.
4. Machinery and engines.
5. Stoves, edge tools, brass, tin, and copper work, and agricultural implements.
6. Carriages and vehicles of all sorts.
7. Wood and implements chiefly of wood.
8. Cabinet-makers' work.
9. Musical instruments.
10. Garden and farm produce.
11. Green-house plants.
12. Fruits.
13. Grain manufactures.
14. Butter, cheese, sugar, and honey.
15. Domestic manufactures.
16. Millinery, embroidery, and needlework.
17. Hats, furs, and tailor's work.
18. Leather, and leather manufactures.

19. Soap, candles, bread, and confectionary.
20. Salt meats and fish.
21. Fine Arts.
22. Clocks and watches.
23. Astronomical, surveying, and electrical instruments.
24. Philosophical machines and models.
25. Improved trusses.
26. Ornamental gilding.
27. Horses.
28. Cattle—distinct breeds.
29. Cattle—mixed breeds.
30. Sheep.
31. Swine.
32. Poultry.
33. Ploughing.
34. Miscellaneous matters.

In a letter from Mr. Robb, the Secretary of the New Brunswick Society, it is stated that they are taking active measures that the Colony shall be well represented at the Dublin Exhibition of this year; and, likewise, that progress is making towards the preparation of a general catalogue of Colonial raw produce; in accordance with the suggestion made some months since to the various corresponding societies by the Colonial Committee of the Society of Arts.

## HOME CORRESPONDENCE.

### THE DECIMAL CURRENCY.

Feb. 26th, 1853.

SIR,—As most travellers will do, I take a lively interest in the movement now going forward with regard to the adoption of a British Decimal Currency; and as I was not able to join in the interesting discussion on this subject reported in this week's number of the Society's Journal, I shall feel obliged by your inserting in the next, the following notes, founded on the experience of various monetary systems, acquired during repeated and prolonged stays in various parts of the continent, and especially at Paris.

1. A change so desirable as the substitution of a well combined Decimal Currency for the present imperfect duodecimal one, should not be retarded by too closely associating it with a change in our weights and measures, and still less by connecting it with an attempt to establish an universal currency.

2. Supposing even that the adoption of an uniform system of coinage for all commercial nations were at once feasible, the standard of one country would very soon bear, with respect to that of another, a premium or discount, inevitably resulting from the turn of trade, and intimately connected with interests which it would not be expedient to interfere with.

3. The pound, or sovereign standard, with its natural subdivisions, ten by ten, down to an unit of about the value of a farthing, would afford a currency more eligible than that of either France or the United States.

4. Those, who, like myself, have watched, during the reigns of Louis XVIII., Charles X., and Louis Philippe, the very slow progress in popular favour of the French decimal, or rather centesimal monetary system, will agree that it has been an actual failure, compared with the rapid development which might have been expected from a system of such unquestionable theoretical excellence, favoured by the mathematical turn of the French mind, and pushed on by Government influence in a country which is the very prototype of centralization.

Of the various causes which may be assigned for this anomaly, one of the most obvious, and which it behoves us most particularly to avoid with regard to our own proposed new currency, is, that the French system, as I have hinted above, is rather centesimal than decimal; Instead of paying to the *décime* the honour which was due to it, calling it to habitual use in monetary phraseology, allowing it a distinct column in monetary arithmetic, and making of it a stepping stone for uneducated intellects between the *centime* and the *franc*, one kind of denomination only, and one column with double figures, were adopted for the expression of everything under 100 centimes.

Now even the attic *prolétaires* of the capital, and still more the Bœotians of the provinces, very naturally thought that it was easier to count up to 20 with sols, or sous, as they call them, than to run centimes up to 100. Supported by this consideration and by the more convenient value of the sol as unit, and backed, of course, by all the prejudices which never fail to muster in favour of long established habits, and patrimonial associations, the old vocabulary offered so obstinate a resistance, that it took almost half a century to drive it from its strongholds in the *petit commerce*; and even now it is lurking in the market-places, and lives on unheeded in village snuggeries.

5. The arithmetic of the poorer classes is much more ready to go upwards by multiplication from the small coin to the large one, than to descend by division from the pound to the farthing.

6. It will be necessary, for the success of the new monetary system, that at the same time that the scale of values is convenient, the names attached to the latter be such as to be readily taken up by the million, with brief manageable plurals easily hooked on to a multiple, like the word "pence."

7. The objection that the expression of a sum in four denominations would involve too many syllables, will be met by a reference to the present manner of expressing complex sums, and by an appeal to the happy facility which we have in England for understanding more than is expressed, as when 2*s.* 6*d.* are expressed by "*two* and sixpence," or 1*l.* 4*s.* by "one pound *four*."

8. In pursuance of the views expressed in the preceding paragraphs, I would propose the annexed scale, which I have endeavoured to adapt to the simple and natural notions of those classes which, as far as the small currency is concerned, can certainly raise the first claim to have their convenience consulted.

| Pounds. M. | Florins. C. | Tens. X | Ones. I. |
|---|---|---|---|
| | | | 1 |
| | | 1 | 0 |
| | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 |

9. Many names have been proposed.—For the *Florin*—Victorine—Albert—Decine. Would "*ine*" in this name and the others of the series given below be pronounced after the English fashion, or the French, or either, according to the education or taste of the parties?

For the *Ten*—Groat; (a denomination already in the popular vocabulary)—Centine—Tenth. Would this name imply that the florin were the standard?—Ring; this might be rather appropriate; for as a ten in silver of the usual shape would be rather too small for convenience, it might be expedient to have it either annular, or formed of a small disc of silver, surrounded with a ring of copper or bronze.

For the *One*—Various names conveying the sense of unit, or minimum—Milline—Cent; open to the question mentioned above in reference to tenth—Rose, with a representation of a rose on the coin; not a bad idea, were it not ungracious to omit the Thistle and Shamrock.

The names which I should wish to propose are those which head the Table. I give the rest because I think that the opinions of many ought to be canvassed on a subject which concerns all. Yours, &c.,

T. TWINING, JUN.

## THE DECIMAL COMPUTATION.

Cheltenham, March 5th, 1853.

SIR,—As my attention was given to the subject of "decimal computation" many years since, with the view of its being brought before Parliament by MR. CANNING, I have read with great interest the report of the proceedings of the Society of Arts, on the 23rd ultimo.

DR. BOOTH seems to be of opinion that the change from the present system to a decimal computation should not "be introduced bit by bit;" and that "to make any alteration without making all, would bring about most intolerable confusion."

On the contrary, it may be apprehended that the attempt to make so complete a change as that contemplated by Professor JACK, would have to contend with an array of ignorance, prejudice, and alarm, which would prevent its being carried into effect.

The practical, and—I say it without offence—the more sensible plan, is that suggested by MR. W. BROWN,—to give powers by an Act of Parliament, which may be put in force by orders in Council, at the times most favourable for introducing progressive changes.

A commencement with the monetary system seems the most desirable, because it is the most simple, and would be forced upon the attention and comprehension of all classes by their daily wants; and with some trifling alterations in his nomenclature, Mr. Brown's plan is the best and clearest that has been proposed, and easily combines with the one suggested in the Report of the Liverpool Chamber of Commerce. The thousand parts into which it is proposed to divide the pound (or sovereign) can scarcely be called *cents;* we must either still call them farthings, or take Professor Jack's term of *millines*, which would soon, in use, become shortened to *mils*. The term *Albert* is unnecessary, as we have already the *florin*.

In every other respect it is impossible to improve upon the plans brought forward by Mr. Brown. Except the fourpenny piece, none of our coins need be thrown out of circulation; and the only change would be in the penny, which would contain *five* farthings, instead of four; or, more correctly, would be $\frac{1}{1000}$ of a pound instead of $\frac{1}{960}$. In use, the whole of the coins would be the same as before; and the only change to which the public would have to accustom themselves would be, that what they had purchased for a shilling would be put down in the account as 50 *mils.;* but with this they would soon become familiar, if the fractional parts of 25, 50, 100, 250, 125, &c., were stamped upon each coin.

Such an approach to the new system as this might be easily introduced, and the rest would follow.

You will perceive that I treat the matter practically, and as a business question; and it is only in this way that the people of England will ever give it their attention. The advantages of a decimal computation (as they must see) are the greater facility with which a knowledge of accounts will be acquired, the diminished liability to error, and the saving of time, both in making the calculations and in the fewer figures by which they may be expressed.

I am, Sir, yours respectfully,

W. M. T.

## PATENT LAW REFORM.

SIR,—As the Society of Arts took a very active part in the last movement for Patent Law Reform, a matter in which I have taken an active part myself, I hoped to have seen some general remarks in its Journal on the unsatisfactory way in which the New Patent Amendment Act is, in many respects, administered, and especially as regards the decision come to during the Chancellorship of Lord St. Leonards, that in no case the old practice of granting patents, embracing the *Colonies* be adopted under the New Act, although the Act provides that in certain cases the colonies may be embraced by the patent. Now this new rule is, I believe, founded on some idea that these matters ought to be left to the independent action of the colonies, although some of the colonies are not in a position to act independently of the Home Government, and the Act itself has expressly provided, that no patent, although it should be stated to extend to the colonies, shall embrace any colony the local laws whereof shall declare the same invalid.

I think it will be needless to justify to the Society of Arts the policy of granting patents for inventions, as a means of inducing the expenditure of the necessary time, thought, skill, and capital, in the cause of industrial improvement, is of importance to the colonies as well as to the mother-country; and if this be so, the same aids to advancement therein must be equally needful to both.

Now sugar, cotton, and gold, are staple articles in the colonies, to effect the production of which with as little labour as possible, is equally important to England and the colonies; both of them, therefore, with the view to obtain this desideratum should be included in the operation of the Patent Laws.

In conclusion, it may be stated, that the Commissioners of Patents have been applied to without success, which is what might be expected, seeing the Board is composed *entirely* of *ex officio* members, each engrossed by the duties of other important national offices, which, having made a set of rules, now abandon them to their fate. Altogether matters are now in such a position that, although much has been effected, much remains to be done, and inventors and all interested cannot do better than form a permanent association for the completion of Patent Reform.

I am, Sir, yours, &c.,

F. W. CAMPIN.

## PHOTOGRAPHY.

SIR,—I little imagined that my suggestion of a blue tinted object glass for the photographic camera would produce the very valuable communication from one of the first photographers of this country, which appeared in your thirteenth Number; but I will endeavour to explain my views on this subject rather more fully than in my former concise notice.

Three spectra are produced by the prismatic refraction of the sun's rays, namely, the thermic, the actinic, and that from the light rays; the latter alone making an impression on our organs of vision, while we are made aware of the two former by thermic, or chemical action. There may be, possibly, other spectra, more particularly as there is much mystery attached to the black bands, which, under favourable circumstances, are plainly visible in all parts of the light spectrum. In the case of the light rays, it is well known that a perfect image cannot be formed in the focus of the object glass without correcting the chromatic aberration, which is now always done. There still remains the aberration of sphericity, but it is not of great magnitude, and is now almost annihilated by first-rate opticians. We have proof also, from the great extent of the spectra, of thermic and actinic aberration; but I am not aware of the existence of any means of correcting either of those, unless the supposition be founded on the fact that the double or triple achromatic object-glass will also rectify the thermic and actinic aberrations.

Further, it is a well ascertained fact that the photographic picture is formed by the actinic rays alone, and my suggestion of a blue tinted object glass was made with the view of reducing the causes of error to one only, and allowing none but the actinic rays to pass through the object glass; and I am rather surprised that Mr. Claudet did not place a thin sheet of blue tinted plate glass before one of his cameras, which would at once have proved its usefulness or otherwise. The copying a print is not a case in point; it is a true and faithful representation of nature that we want, such as we see on the ground glass in the camera. Moreover, I had not photographic portraits in my mind at the time, but rather views of buildings and monuments of great architectural beauty, which I should wish to see represented in the style of *Prout* or *Canaletti*, with a proper artistic gradation of middle tints from the brightest light to deepest shade; nor do I understand how excluding the light rays which confessedly do no good, but which may possibly do great harm, can be any disadvantage. Every experienced photographer can focus the camera for the actinic rays, and therefore cannot require the very bright light rays for focusing.

As my only object is the improvement of the photographic art, I shall take this opportunity of making one or two suggestions with that view. First, I should wish that the photographic camera could be constructed of such a size that the photographer could place himself inside, with a stool and shelf, upon which he might perform the whole of the manipulations; and that the sensible tablet should not come out of the camera until it was completely fixed. On the outside of the camera there should be a yellow glass lantern with reflector, showing a light inside. There should also be sliding shutters fitted to it inside, as well as to the object glass; and of course the camera should be well and thoroughly ventilated. It will be said that there are formidable obstacles to such a procedure; but what *would* have been said fifty years ago to the proposer of a sub-marine electric telegraph, or of photography itself?

Another suggestion I would make, would be the introduction of the principle of Mr. Varley's graphic telescope into the construction of the camera. By the enlargement of the image the sitter might be placed at a much greater distance, still obtaining photographs of the usual size, a process which would render the perspective much less harsh. Portrait painters always imagine their sitters to be placed at a much greater distance than they really are; otherwise their perspective is false, as any one may convince himself by holding up his two hands at unequal distances from his face, when he will find that he can make the nearer hand appear twice the size of the other that is more distant; a circumstance never observed in the works of portrait painters, but constantly and necessarily in photographs as they are now produced. All the features nearer the camera are represented larger in proportion than those more distant; and unless some change be made, photographs will never become, in common phrase, pleasing likenesses.

I am, Sir, &c.

*Parkstone, Feb.* 23, 1853. HENRY W. REVELEY.

## MEASUREMENT OF TONNAGE.

London.

SIR,—In the Society's Journal, a discussion has been raised which I hope will not be hastily dropped, and which I think very important, namely, that of the advancement of marine navigation. A letter appeared (in No. 7, page 76) from *a correspondent*, which first brought the matter before you in a report of the progress of marine navigation of 1852; and, although it contained one or two errors of arrangement, led to two letters. One (in No. 9, page 104) from Mr. W. Roberts, making a statement about the new method of advancement, as laid down by the new law, which was not quite correct either. The second (in No. 10, page 116) from Mr. Henry W. Reveley, which again called attention to the subject in answer to the first.

I must now refer you to a very explicit and valuable work by Admiral Moorsom, going most fully into the old and new methods of measurement, and pointing out the defects of both, and preparing a new mode of internal measurement, which he is very capable of giving, having been on a Committee of investigation, the labours of which led him to write his present work, and which, to my mind, answers all the purposes most perfectly. It proposes to give the capacity of the hull, and not to any false notion about the distance between the perpendiculars and her size amidships, at the water line. A pamphlet from B. Sharpe, Esq., R.N., also gives general views in the same direction, and which would leave the builder much more free, as to the best form for capacity and sailing or steaming purposes.

There is no reason why the Americans should beat us in the form of their ships. We surely have as large an amount of science amongst our ship builders as they can possibly have; the only reason is, that our laws bind us improperly in a false direction.

I could make large extracts from the work by Admiral Moorsom, but I do not wish to occupy, unnecessarily, your space.

Allow me to mention, that if Dock Companies were the only owners and builders of ships, the form they would most likely adopt would be parallelograms with rounded ends or Dutch galliots, containing a nearly square admeasurement, so that their docks would contain a greater number of ships with a larger burden, whereon to pay dock dues. And if merchants and underwriters were the only owners and builders, they would require only speed, or ought to do so, for they would ensure a more speedy return of their money, and much less risk at sea, by the reduced number of days the ship would be exposed to the dangerous elements. If a clipper could always ensure a passage of 98 to 100 days from Canton to London, surely she would greatly diminish the chances of accident or loss than if she occupied twice that time, which some of the old tubs now take, and would fetch a larger payment per ton.

You will now perceive how very necessary and important it is to have improvement, in the forms of ships, to effect fast sailing. If it is found desirable even with the Newcastle colliers to build new ships, and have auxiliary screw power to ensure speedy journeys to the port of London on a passage of a week or a fortnight at the farthest, how much more desirable would it be to apply the auxiliary power to the best sailing ships,—with a feathering screw, so that they might not be obstructed when sailing,—which perform voyages to the antipodes or to China.

There are great numbers of sailing vessels now lying rotting in the ports of Australia on account of the desertion of the crew. If they had had screws in their tails, with a very few men, they might have been enabled to reach some port by means of that power, by steaming, where labour is cheap and obtaining Lascars or Indians would have been brought home again. Labour in Calcutta can be obtained to any amount at a very cheap rate, and by these means perhaps advancement and civilisation could be given to another of our colonies.

I merely throw out these ideas in the hope that they may bring correspondents on the subject of the advancement and beneficial results of ship building and steam propulsion, whereby already great benefits have been effected in most parts of the world. Yours, &c.,

H. M., Member.

## PROCEEDINGS OF INSTITUTIONS.

LONDON.—On Monday evening the 28th of February, at a meeting of the members of the St. Michael's (Pimlico) Literary, Scientific and Mechanics' Institution, the Rev. J. H. Hamilton, M.A., President, in the chair, a Lecture was delivered by Mr. W. Walker, "On Superstition." Afterwards, the President presented to Mr. Joseph Bannister, the Honorary Secretary of the Institution, a silver inkstand, the joint voluntary subscription of the friends and members, in recognition of his zeal and exertions in promoting the interests of the Institution. The President announced that a donation of 460 volumes, chiefly of a scientific character, had been received from Mr. Frederick Robinson, of Pimlico.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

A neat Case, for holding the Numbers of the Journal for half a year, is now ready, and may be had of the Publisher, 186, FLEET-STREET, price 1s. 8d.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

### ANSWER TO CORRESPONDENT.

*Anti-corrosive Paint.*—We are informed that Walter Carson and Son, 9, Great Winchester-street, Old Broad-street (successors to the original inventors), and Messrs. S. and W. Tudor, 166, Upper Thames-street, are manufacturers of this material.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 3rd March*, 1853.

129. Duchy of Lancaster—Account.
141. Occupiers (Ireland)—Return.
166. Public Petitions—Return.
164. Bills—New Trials (Criminal Cases.)
168. „ —County Rates and Expenditure (amended).
183. „ —Jewish Disabilities.

*Delivered on 4th March.*

163. Mint—Account.
184. Expiring Laws—Report from Committee.
187. Metropolitan Improvements—Accounts; Convict Discipline and Transportation—Further Correspondence.

*Delivered on 5th and 7th March.*

186. Committee of Selection—Second Report.
78 (1). Derby Election—Index to Minutes of Evidence.
149. Turnpike Trusts (Ireland)—Abstract of the General Statements of Income and Expenditure.
178. Irish Reproductive Loan Fund—Account.
179. Battersea Park—Copy of Letter from T. Cubitt, Esq.
191. Local Acts—Reports of the Admiralty.
192. Trade and Navigation—Accounts.
194. Bills—Places of Religious Worship Registration.
196. „ —Cathedral Appointments.
197. „ —Burghs (Scotland).
188. „ —Payment of Wages.
195. „ —Judges Exclusion.
200. „ —Metropolitan Improvements (Repayment out of Consolidated Fund) amended.
201. „ —Oaths in Chancery (amended).
202. „ Law of Evidence (Scotland).
Prisons—Seventeenth Report of Inspectors (Northern and Eastern Districts), Part II.

*Delivered on 8th March.*

181. Court of Chancery (Suitors' Fund)—Return.
185. Cambridge Election—Minutes of Evidence.
187 (1). Metropolitan Improvements—Account.

*Delivered on 9th March.*

113. Emigrant Ships—Return.
156. Dissenters' Places of Worship—Return.
189. Foreign Shipping—Account.
193. Bill—Fisheries (Ireland).

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED

*From Gazette, 4th March*, 1853.

*Dated 15th Jan.*, 1853.

106. H. C. Nion—Apparatus for refrigerating.

*Dated 29th Jan.*

228. T. H. Wilson—Securing carriage-gates, doors, &c.

*Dated 3rd Feb.*

292. J. Heckthorn—Colouring buildings, &c.

*Dated 16th Feb.*

401. J. Cutler—Spoons, forks, &c.
403. G. G. Mackay—Drain-pipes.
404. J. Skertchly—Copying press.
405. J. Day—Protecting insulated wires.
407. J. G. Perry—Bookbinding, and facilitating the finding of places in books.
409. W. Jones—Stretching woven fabrics.

*Dated 17th Feb.*

413. J. Murphy—Permanent way.
414. W. Pidding—Saccharine substances, and apparatus for treating same.
415. M. Walker—Improvements in vessels for beer and other liquors.
416. C. Gordon—Goniometric protractor.
417. D. Cochrane—Improvements in closing doors.
419. G. L. L. Kufahl—Atmospheric currents for motive power.
420. W. Hawes—Refining sugar.
421. C. Watt—Coating iron with copper and brass.
422. Isaac Frost—Reaping.

*Dated 18th Feb.*

424. J. Horsfall—Pianoforte-wire, &c.
425. C. B. Clough—Apparatus for detaching boats, &c., from their moorings.
426. W. Darling—Manufacture of iron and other metals.
427. C. Kinder—Mantelpieces.
428. H. Noad—Treating grain, and obtaining products therefrom.

*Dated 19th Feb.*

430. J. White—Fastenings for harness.
431. F. C. Hills and G Hills—Refining sugar.
432. W. R. Dell—Dressing flour.
433. C. Cowper—Zinc white.
434. C. Nightingale—Drying and heating certain substances.
435. J. Anderson—Motive power.
436. P. A. Tourniere—Propelling.

*Dated 21st Feb.*

437. W. Jones—Steam-pipes for warming, &c.
438. S. R. Samuels and R. Sands—Looms.
439. J. O'Leary—Numbering entrance and exit of passengers in omnibuses.
440. J. Ramage and T. Coffey—Chandeliers, &c.
441. J. Mash and J. S. Bailey—Machinery for textile fabrics and manufacture of same.
442. W. Pidding—Coverings for feet of bipeds or quadrupeds.
443. R. Farrant—Improved chimney-pot.
444. E. Miles—Railway-breaks.
445. T. Bell and R. Chrimes—Improvements in valves.
446. B. Barton—Improved bath, which may be used as a life-boat.
447 J. C. Pearce—Steam-boilers.

448. J. D. M. Stirling—Manufacture of wire.
449. W. Wilkinson—Ropes, bands, &c.

*Dated 22nd Feb.*

450. J. and T. B. Hudson—Bricks, tiles, drain pipes, or tubes.
452. G. Winiwarter—Firearms.

*Dated 23rd Feb.*

454. S. Beckett—Mule spindles, &c.
456. E. T. Brookes, J. Black, G. Stevenson, and W. Jones—Machinery for looped fabrics.
458. R. Plant—Safety-lamps.
460. S. C. Lister—Improvements in treating soapsuds.
462. A. C. Engert—Joints of parasol-sticks, &c.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 5th March, 1853.*

182. Samuel George Archibald, of Pall-mall—Improved mode of extracting or rendering animal fats and oils.
228. William Edward Newton, of 66, Chancery-lane—Improvements in machinery for boring or cutting rocks or other hard substances, for the purpose of tunnelling through mountains, or making other excavations.
229. William Edward Newton, of 66, Chancery-lane—Improvements in the means of producing a vacuum for various purposes, such as condensing steam, pumping water, exhausting air, or other purposes where a vacuum is required.
256. John Cronin Jeffcott, of 1, Anglesea-street, Cork—Producing heat for generating steam, and applicable to and for other purposes for which this invention has not hitherto been used, under the name and title of a heat-producer and steam-generator.
269. William Vaughan Morgan, of Jewin-crescent, London—Improvements in the preparation of oils for the purposes of illumination and lubricating machinery.
401. William Edward Newton, of 66, Chancery-lane—Improvements in washing and amalgamating gold and other metals.
442. William Newton, of 66, Chancery-lane—Improved machine for separating ores, metals, and other heavy substances, from mud, sand, gravel, stones, and other impurities.
676. William Edward Newton, of 66, Chancery-lane—Improvements in the manufacture of the carbonate of soda.
690. James C. Booth, of Philadelphia, Pennsylvania, United States of America—Manufacturing chromate and bichromate of potash from chromic iron or chrome ore.
692. William Edward Newton, of 66, Chancery-lane—Improvements in the construction of axles or axle-trees.
722. George Kendall, of Providence, Rhode Island, United States of America—Improvements in apparatus to facilitate the manufacturing of mould candles.
816. William Edward Newton, of 66, Chancery-lane—Improvements in the manufacture of paper. (A communication).
966. James Buchanan, of Glasgow—Improvements in the treatment of flax and other similar vegetable fibrous substances, and in the machinery employed therein.
1041. Alfred Vincent Newton, of 66, Chancery-lane—Improved apparatus for regulating the density of fluids. (A communication.)
1079. Sir Francis Charles Knowles, of Lovell Hill, Berks, Baronet—Improvements in the manufacture of iron.
1163. Alfred Vincent Newton, of 66, Chancery-lane—Improvements in obtaining and applying motive power. (A communication.)
31. William Louis Sheringham, of Southsea, Hants, Captain in Her Majesty's Royal Navy—Illuminating buoys and beacons in harbours, roadsteads, and rivers.
40. William Beales, of Louth, Lincolnshire—An improved cement for the resistance of fire.

*Sealed 9th March.*

23. Jean Baptiste Lavanchy, of Richmond-buildings, Soho—Improvements in wind musical instruments, where metal tongues are employed.
140. Thomas Robson, of Woolwich-road—Improvements in apparatus for igniting signal and other lights.
153. David Stephens Brown, of 2, Alexandria-lodge, Old Kent-road—Invention of an agricultural implement for tilling the soil.
164. John Robert Johnson, of Stanbrook-cottage, Hammersmith—Improvements in fixing colouring matter of madder in printing and dyeing.
168. John Macintosh, of Berners-street—Improvements in compositions to be used as paints.
238. William Gilbert Elliott, of Blisworth, Northampton—Improvements in the manufacture of bricks, pipes, tiles, and other articles capable of being moulded.
521. John Cross, of Blue Pits, Rochdale, Lancashire—Improvements in steam-engines.
633. John Macintosh, of Berners-street—Improvements in projectiles and cartridges.
769. John Wheely Lea, of Worcester, and William Hunt, of Stoke Prior, Worcester—Improvements in utilizing the waste heat of coke furnaces.
793. John Robert Johnson, of Stanbrook Cottage, Hammersmith—Improvements in the manufacture of type or raised surfaces for printing.
815. John Wheely Lea, of Worcester, and William Hunt, of Stoke Prior, Worcester—Improvements in the manufacture of iron.
882. Antonio Fedele Cossus, of University-street—Improvements in lubricating apparatus.
908. Francis William Ellington, of Drummond-street, Euston-square—Improvements in the making of screws for collapsible and other vessels.
987. Alfred Vincent Newton, of 66, Chancery-lane—An improved mode of transportation for the conveyance of letters, packages, freight, or passengers from one place to another. (A communication.)
1101. Thomas Elliott, of Stockton-on-Tees, Durham—Improvements in steam-engines, which are also applicable to pipes.
1126. William Edward Newton, of 66, Chancery-lane—Improvements in lamps, and in apparatus to be used therewith. (A communication.)
1130. Alfred Vincent Newton, of 66, Chancery-lane—Improvements in the means of urging the fires and increasing the draft of furnaces, and in arresting the sparks given off from the chimneys of locomotive engines. (A communication.)
1135. William Aspdin, of Gateshead-upon-Tyne—Improvements in the manufacture of Portland and other cements.
1186. John Copling, jun., of the Grove, Hackney—Invention of a safeguard railway signal.
1191. William Edward Newton, of 66, Chancery-lane—Improvements in the manufacture of carpets. (A communication.)
6. Thomas Billyeald, of Ison-green, Lenton, Nottingham—Improvements in the apparatus and arrangement of apparatus for making looped fabrics.
32. Edward Hutchinson, of Tyldesley, Lancashire—Improvements in the mode or method of preparing, cleaning, drying, and otherwise treating wheat, pulse, seeds, and other grain.
41. Peter Graham, of Oxford-street—Improvements in the manufacture of carpets and other piled fabrics. (A communication.)
50. Richard Gittins, of 2, Thayer-street, Manchester-square—Improvements in tills.
66. John Davie Morries Stirling, of Larches, Camphill, near Birmingham—Improvements in the manufacture of percussion-caps.
72. James Thornton, of Derby, John Thornton, and Albert Thornton, of Melbourne, Derbyshire—Invention of improved nets and other textile fabrics to be used for gloves and other purposes, and for the machinery to be employed in the manufacture thereof.
73. Joseph Robert Wilkin Atkinson, of Leeds—Improvements in machinery for preparing and spinning flax, tow, and other fibrous substances.
86. Edward Haslewood, of Tufnel-park, Holloway—Improvements in firearms and projectiles. (A communication.)
89. John Bennett, of Bradley Mills, Huddersfield, and Henry Charlesworth, of Huddersfield—Improvements in doffing and preparing rovings of wool.
101. William Steads, of Redcross-street, Leicester—Improvements in blinds, maps, charts, and other articles, wound on rollers.
121. Henry Browning, of Bristol—Improvements in preparing compositions for coating iron, and other ships' bottoms and other surfaces.
123. Orlando Reeves, of The Castle, Taunton—Improvements in the manufacture of manure.
130. Sydney Smirke, of 24, Berkeley-square—Improvements in apparatus for giving signals on railways.
182. Warren Fish Shattuck, of 373, Strand—Invention of a smut-machine. (A communication.)

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| March 3 | 3428 | Improved Gas Retort | Ebenezer Thornton | Huddersfield, Yorkshire. |
| " " | 3429 | An Air-tight Screw Nozzle for Powder Canisters | Chas. Berwick Curtis | 74, Lombard-street, London. |
| " 7 | 3430 | Tylor's Gardener's Syringe for Conservatories | G. Tylor and Sons | Warwick-lane, London. |

# SOCIETY OF ARTS.

**FRIDAY, MARCH 18th, 1853.**

## FOURTEENTH ORDINARY MEETING,

*Wednesday, March 16th*, 1853.

The Fourteenth Ordinary Meeting of the Society was held on Wednesday, the 16th inst., Thomas Winkworth, Esq., in the chair.

The following were elected Members :

Bowring, Edgar A., Board of Trade, Whitehall.
Conybear, John Charles, Kew-green.
Grimston, Capt. Leopold, R.A., Woolwich.
Ridgway, John, Cauldron-place, Staffordshire Potteries.
Wilkinson, Joseph, 31, St. George's-road, Borough.

and the names of nine candidates for membership were read.

The following Institutions have been taken into union since the last list was published :

Alton, Mechanics' Institution.
Bury, Athenæum.
Uttoxeter, Literary and Scientific Institution.

Mr. Kilburn exhibited a folding Stereoscope, combining in one case the miniatures, or subjects, and the binocular instrument. The advantages of this contrivance are greater portability, at a less cost; as by superseding the necessity for an additional instrument, less expense was incurred.

A paper, "On Warming, Ventilating, and Cooking by Gas," by J. O. N. Rutter, Esq., was read.

After adverting to the great facilities which gas offered as a fuel, and the advantages which its use possessed over all ordinary forms of fuel, the author proceeded to observe, that the usual form and construction of gas-stoves for warming, and which have been in use nearly twenty years, may be described as cylindrical, and made of cast or wrought iron, say ten to eighteen inches in diameter, two feet, or two feet six inches in height, with openings at the top and bottom. At the lower end, about three or four inches from the floor, a ring-burner is fixed, pierced, according to its size, with from thirty to sixty holes for supplying jets of gas. In some instances, the top of the stove is finished with an ornamental casting; in others, with a sliding-valve (professedly) for regulating the supply of heat.

By these means, simple enough apparently, a gas-fire is obtained. Its advantages are said to consist in freedom from dirt and dust; a great saving of time and labour; facility of adjustment, so as to obtain any required degree of temperature; economy as respects cost; and no necessity for a flue or chimney. Some hundreds, probably thousands, of such stoves have been sold; and however they may have differed in external form, or internal arrangement, in principle they have been essentially alike.

By the means thus described, a gas-fire warms the air in an apartment; and if the room be of the ordinary size, and there be not much opening and shutting of doors, a small quantity of gas, say, six to eight cubic feet per hour, will be sufficient to maintain a temperature equal to 60° or 65° in very cold weather. This is done by setting the air in motion—in reality, by heating and then drawing part of it through the cylinder, and diffusing that heat, by the motion thus imparted to the air, among the other parts. All this is easy and simple; and, with only one very important exception, it deserves everything just now said in its praise. There never has been any mystery in warming with gas in this way; the only wonder is, that it has been so long practised. But along with the heated air there are also emitted aqueous vapour, and azotic and carbonic acid gases,—the products of combustion common to all the ordinary kinds of light-giving and heating materials. This is the exceptional, and, as ought generally to be known, the objectionable part of the process. That which is so often cited as one of the principal advantages of a gas-stove—namely, there being no necessity for a flue, or chimney—is anything but an advantage, anything rather than a recommendation, and should never be listened to, or adopted.

If it be asked, "How can a gas-stove be more objectionable than a common gas-burner, consuming an equal quantity of gas?" I reply, that the conditions are not alike. Assimilate the conditions, and even then the objections to the stove would be only partly, not entirely, removed. Let it be remembered, warming by gas implies that the fire must be lighted early in the morning, and kept burning the whole of the day,—at the lowest estimate twice, if not three times, the number of hours an ordinary gas-burner is in use. If it happen that both heat and light are required in the same room and at the same time, the greater the necessity for ventilation, and the more forcible the objection to using a gas-stove without ventilation.

Admitting, for a moment, that the products of combustion from a given quantity of gas are exactly the same, whether the gas be consumed in a burner for giving light, or in another form of burner for giving heat, there are other conditions in the latter case which must not be overlooked. In a gas-stove, the burner is near the floor, whence a current of air is constantly flowing towards it. By reason of its situation and capacity, a great quantity of dust enters the stove. This comes in contact with the gas-jets and the surrounding metal, and is burnt (carbonized), diffusing itself throughout the room. When gas is burnt in small, separate jets, it is difficult to make sure of its perfect combustion. If one jet be defective, the odour of the unburnt gas is offensive; or if combustion be imperfect (a blue flame), the odour is peculiar, and anything but agreeable. The products emitted from a stove are diffused at a lower level (two feet or two feet and a half from the floor) than those from a common gas-burner. The latter ascend instantly towards the ceiling, their higher degree of temperature impelling them thither, and where they are comparatively out of the reach of the occupants of the room. The former, being at a lower temperature, move more slowly, and thus mix with the air at the lower parts of the room.

As respects the heated vapour and gaseous products emitted by a common gas-burner, it would be much better if they were conveyed out of the room, instead of being diffused within it. This cannot be denied. As a question of quantity, however, it will be acknowledged that a room, in which a gas-stove is kept burning all day, must be relatively more insalubrious, when lighted up at night, than if no such means of warming had been employed.

It deserves notice, how often every-day practice brings to light compensating conditions which are never anticipated, because they are only known to exist when practice and experience have been the instructors. It is so in the case under consideration.

A house well lighted with gas is more easily, and more effectively ventilated, than another of the same dimensions, with the same arrangements, and in the same locality, but which is lighted with candles. In the former, the walls, and ceilings, and furniture are dry and warm,—the conditions most favourable to spontaneous ventilation, because most in conformity with the natural process in operation out of doors. In such a house it is impossible for air to be at rest. Interchange is constantly going on; cool, pure air, entering from without, and being warmed, and then escaping to give place to a further supply. This process may be assisted by a few simple contrivances for the admission of fresh air. Make sure of that, and there need be no great anxiety about what becomes of the vitiated air. Both kinds cannot occupy the same space at the same time. If cool air gets in, warm air must go out.

Spontaneous ventilation, under the circumstances just described, is not difficult. Not so, however, when a new set of conditions arise; that is, when the purpose is to retain the heated air, instead of facilitating its dismissal.

The preceding remarks are intended to apply to private dwelling-houses. In shops, warehouses, and public buildings, where doors are almost always, or at any rate frequently open, and where there are contrivances for ventilation, inapplicable to private apartments, we may tolerate what we cannot cordially approve. But in such situations it is no more necessary to contaminate the atmosphere, by the products from a gas-stove, than it is in a dwelling-house.

These difficulties or objections may, however, easily be removed. If a stove, similar to that already described, open at the bottom and fitted with a ring-burner, be made perfectly air (gas) tight at every other part, and a tube equally tight, say one and a half or two inches in diameter be attached to it, so as to convey the vapour and gaseous products into a chimney, the object is attained. Such stoves have been in use these eight years; and it is impossible to praise them too highly. The form of stove attended by the best results in producing an agreeable temperature, promoting ventilation, and economizing gas, consists of two, and sometimes three cylinders, so adapted that the heated air circulates between them, which rising first to the top, and then descending about half-way, makes its escape by a flue fixed at the back, or on one side, as is found to be most convenient. By this arrangement a greater amount of surface is exposed to the action of heat, the principal part of which is retained; whilst the dust, and vapour, and gases, are conveyed away. Radiated heat—that which passes through the metal, or other material of which the stove is made—alone enters the room, warming the surrounding air, and setting it in motion, as before described. But in this case it is heat only that is emitted by the stove. Attention and management are necessary; but the proper adjustment of gas-jets according to the size of the room, the temperature required, and the state of the weather, might be known in two or three days; and then the management of the stove need not occupy two minutes a day.

In using gas as a fuel we must not attempt to warm a large room by means of a small stove. The proper degree of heat will not be obtained by consuming an extra quantity of gas, as only a certain quantity of heated air will pass through a stove, according to its size, in a given time. If we try to force it beyond its fair average limits, the metal (or other material) will be over-heated, and emit its characteristic (empyreumatic) odour; some of the gas will escape unconsumed; the interior of the stove will be blackened by smoke, ventilation will cease, and the whole affair become unbearable. In practice it is found that the best effects are obtained when the gas-jets do not exceed three-quarters of an inch in height. They may be less than that, but ought never to be more.

A gas-stove must not be fixed in an open fire-place, as the heat will escape into the chimney. Nor should it be placed immediately in front of an open chimney; or supposing it to be partially or entirely stopped, the tube (flue) belonging to the stove must not pass direct to the chimney by the shortest route. A knowledge of this is important. If the stove be so connected with the chimney, or wall of the room, that the exit flue be only one or two feet in length, a great portion of the heat will be wasted. It is of no consequence at what particular part of a room the stove be fixed. Comfort, convenience, and the realization of the best effects ought to determine that. But the flue (tube) should not be less than 6 feet, and it will be all the better if it be 10 or 12 feet in length. The flue thus forms part of the stove, extending the radiating surface, and parting with heat so quickly that at one foot from the stove the temperature will be, say, 130°, but at ten feet only 70°. In this way the heated air and offensive products are conveyed out of the room; whilst probably seven-eighths of all the heat generated by the gas is retained within it. On this principle the use of gas as a fuel can alone be economical as respects cost, when compared with coal and coke. It is impossible to keep up a fire with ordinary fuel that shall produce exactly the same degree of heat, and distribute it as equally over a given period, as can be effected by gas. The waste of heat in an open fire-place, whatever its size, or shape, or other peculiarities, is scarcely ever less than one-half, and very frequently a great deal more. Here it is that the use of a gas fire contrasts most favourably with a common fire; and if properly applied, its advantages would soon be discovered.

Difficulties will present themselves, and objections be made, on account of the length of the flue here recommended; and in some cases, perhaps, it will be considered so great a violation of good taste, that, whatever the consequences, it will be dispensed with. It is a choice between an open stove, diffusing a vitiated atmosphere, over-heating the room, and depositing vapour on the windows; or a close stove, warming the air of the room, without impairing its salubrity, ventilating as perfectly as it warms, doing no injury to the most costly furniture or delicate colours, and creating sensations of comfort which, when once experienced, are not easily forgotten.

A gas-stove must be looked upon as a temporary arrangement. One of its benefits consists in the ease and quickness with which it can be fixed, and, when done with, removed. Many little contrivances may be resorted to for concealing, or abating, the unsightliness of the flue. If it be painted to harmonize with the walls or furniture of the room, there will not be much cause for complaint.

Supposing the room to be warmed has neither a fire-place nor a chimney, the flue from the stove might be carried into a chimney which has a quick draught in some other part of the house. If it cannot with propriety be conveyed overhead, it must descend; passing between the ceiling and floor, or penetrating both. The distance is of little consequence. A flue will act perfectly if it be fifty feet long.

A few cautions are necessary. Whatever be the direction, or length of the flue, let the quantity before mentioned, say six to twelve feet, be kept in the room with the stove. In its course, whether rising above the room, or descending below it, special care must be taken to incline the tube downwards towards the chimney it is to enter. This is to insure the perfect drainage of the condensed vapour. A fall of about one inch in every ten feet will be sufficient. The tube should not, by choice, be taken out of doors in any part of its route to the chimney. If it must be so, let it be well protected; that is, kept dry and warm. A kitchen chimney, or any other constantly in use during winter, is sure to answer. It is useless to attempt to make a gas-stove succeed properly if the flue be taken through the wall, or roof, into the open air. Iron tubing is in every respect preferable to any other. It is made expressly for the purpose, in lengths varying from one and a half to twelve feet, which screw together, and can be fitted up as easily as gas-tubing. A valve should be fixed in the flue (tube) at about two or three feet from the stove. This is to prevent smoke or cold air entering the room when the stove is not in use.

The author then compared the relative cost of warming by gas and by coal, and alluded to the safety of gas-stoves. Other kinds of close stoves, he said, were attended with danger; scarcely a week passed, during cold weather, without some terrible accident from over-heated flues. It was next to impossible to make the flue of a gas-stove so hot, at eight or ten feet distant, as to do the slightest injury.

By means of a gas-fire, a greater quantity of heat can be made available, and more uniformly distributed over the different parts of a house, than by an open fire. If the products be conveyed away in the manner here explained, there will be warmth accompanied by ventilation. The exact temperature required, by day and night, can be calculated on with certainty. There are no dust, dirt, noise, or other sources of annoyance, and consequently no cleaning required. The air that comes in contact with the stove is only warmed—not heated—and therefore it never produces dryness of skin or headache.

Nothing is more deceptive than an agreeable temperature, when it can be obtained by apparently simple and inexpensive means, and without the inconvenience of smoke and other troublesome accompaniments. Hence the continued use of portable stoves and the "prepared fuel," (in reality charcoal,) than which nothing can be more deleterious. Azotic and carbonic acid gases are invisible; but because they are not seen, they are not the less dangerous.

A gas-fire that can be seen,—resembling in some respects the common domestic fire,—commends itself to our feelings, and identifies itself with many pleasant associations. The skill, and taste, and energy lately put forth in devising and improving various articles of gas apparatus are quite equal to the task of constructing a stove in which the fire should be seen, although it be enclosed, and which should diffuse heat only, unattended by, and unmixed with, vapours, odours, or other products of combustion. Until this, or something even better be accomplished, let us not boast too much of sanitary improvements. To little purpose shall we construct sewers and drains for conveying away that which is unsightly, as well as offensive, at the lower parts of the house, if nothing be done to keep up a good supply of pure air at the other parts. We may seem to be very much in earnest, in keeping out that which makes its presence known by unmistakable proofs, whilst no efforts are directed towards the expulsion of a foe far more insidious, and, therefore, much more dangerous.

No greater dis-service can be done to the science of gas-lighting than by the very general and indiscriminate use of gas-stoves in dwelling-houses, unless accompanied by effective ventilation. Equally true is it that nothing is more certain to increase the sale of gas than a judicious, healthful, and philosophical adaptation of it to domestic warming, ventilating, and cooking.

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**Mr. G. Lowe** remarked that gas stoves were more beautiful, convenient, and economic than coal fires, and expressed a hope that the greatly reduced price and increased purity of gas at the present day would have the effect of bringing them into general use. He coincided with Mr. Rutter's remarks as to the impurities of gas, and referred to a statement he had made in the *Philosophical Magazine* of as far back as 1818, to the effect than an Argand burner, when reduced to a blue flame, gave off something, which he at that time, for want of a better name, called Lampic Acid, but which they were now informed by chemists was Aldehyde. This it was necessary to get rid of, and every one would admit that it was better it should go up a chimney than up the nostrils.

**Mr. Varley** said the question of warming and ventilating by gas at first seemed to present the anomaly of pumping water to turn a mill, as a portion of the coal was burnt in order that another portion might be obtained for domestic use. But if it could be justified on the ground of economy, he thought the convenience and cleanliness of the system must speedily recommend it to the public. He was glad that Mr. Rutter had spoken so clearly on the subject of ventilation; for when it was remembered that one candle burning consumed as much air as a man, and a large gas-burner manifestly more than that, it must be evident that some means of getting rid of foul air and supplying fresh air was imperative. He then referred to the plans for ventilating introduced by Mr. Gowland and Professor Faraday, but considered that that recommended by Mr. Rutter was simpler and cleaner than either.

Mr. **Gore** had paid some attention to the subject, and quite agreed with the remarks of Mr. Rutter. He was afraid, however, that the audience had scarcely been sufficiently cautioned against the indiscriminate use of gas stoves for heating apartments. During the last eighteen months he had attended to the fixing of between thirty and forty stoves of all classes, from those styled self-ventilating stoves requiring no flue, to those which were all flue, and, as had been remarked, carried off the heat as well as the impurities, affording scarcely any warmth at all. In the first there was no ventilation, and the air of the room was impregnated with this lampic acid, and in the last about four-fifths of the heat was lost. The object was, then, to get a sufficient amount of radiated heat for the purpose of warming, whilst ventilation was effected. Recently he had tried the experiment of placing a small gas stove without a flue, into one of Dr. Arnott's stoves, by which warmth, cheerfulness, and ventilation had been secured. He explained the impropriety of bringing an iron flue in contact with the open air. Iron being unlike brick, a good conductor, became readily chilled, and a vacuum being thus formed in the flue caused a rush of cold air into the room, which also carried with it all the impurities they wished to get rid of. He was glad the question had been brought before the Society, and trusted that the inquiry would be prosecuted, and one of the essential objects of the Society — the application of science to the purposes of every day life—thoroughly carried out.

A Gentleman in the room referred to the use of wire gauze for admitting and distributing cold air. In reference to the modes of burning gas, he believed there were three: the first, in which the combustion was incomplete, much of the carbon passing off in the form of smoke; the second, when the combustion was complete, and a brilliant light was produced; and the third, where there was a blue flame. He wished to ask Mr. Rutter, which was the best and most efficient mode of burning gas?

**Mr. Ashpitel** said, this subject derived a peculiar interest from the fact that it had occupied much of the time of the late John Sylvester for some time before his death; and an invention of his would shortly be made public, which would embody much of what had been stated as desirable by Mr. Rutter. He could not now enter into the details; but he might remark, that it would dispose not only of the azotic impurities, but also of the aqueous vapour, the presense of which all the previous speakers appeared to have overlooked. This could be done without a chimney, by a process analogous to filtration. The peculiar "irony" smell, common to almost all stoves, might be got rid of by having two thicknesses of iron, with water between, which would prevent the outer surface from becoming overheated, and thus emitting the unpleasant odour. To compensate for the check to the diffusion of heat thus caused, radiating surfaces, called "gills," would be used.

**Dr. Bachoffner** said, nothing could be more objectionable than gas stoves without flues, and sometimes even with them, when chimneys were so ill-constructed as under some circumstances to have a downward instead of an upward draught. He then referred to the strong prejudice of the English in favour of open fires, and explained a plan of which he was the co-inventor, whereby this object and ventilation were both obtained. He believed inquiry on the subject was progressing in the right direction, and hoped in a few years that a gas fuel would be discovered which would render gas fires at once cheerful, cheap, and useful, and as numerous as gas-lights were now.

**Mr. Strode** could not agree with Mr. Rutter's remarks in regard to carrying iron flues into the open air. His experience as a practical gas-fitter had convinced him that it might often be done without bad results. He explained a plan which he had successfully used for preventing down draughts. At the bottom of the stove he had an air-chamber, which was placed in communication both with the outer air and with the flue,—this he had never found to fail.

**Mr. Meade** thought that the prejudice in favour of open fires might easily be removed by proper explanation of their disadvantages. In regard to the means of getting a sufficient length of flue in the room to heat it, without being in the way, or looking unsightly, that might be done by making the flue in coils. The plan of having water between two thicknesses of iron was impracticable, because from the necessary variations of temperature there would be danger of explosion if it were entirely confined, and if not the room would be filled with steam. In regard to cooking, of which little had been said, a great prejudice would have to be overcome, on the ground of the smell. As to the cost of cooking, a gallon of water might be boiled for a farthing; three quartern loaves baked for a penny, and a joint of meat, weighing five or six pounds, cooked for the same sum.

After a few remarks from the Chairman on the history of Gas-lighting, a vote of thanks was passed to Mr. Rutter, for his paper.

**Mr. Rutter** in responding, after acknowledging the vote, said, that as to the wire gauze he believed it was simply useless. The best mode of burning gas so as to get the most heat at the least cost, he believed to be by bright, full combustion, and not by the blue flame. In regard to Dr. Bachoffner's allusion to bad chimneys, he had stipulated in his plan for a good one, as necessary to satisfactory results.

**The Chairman announced that the Society would adjourn over the Easter Holidays; and that the next meeting would be held on Wednesday, April the 6th, when a paper would be read by Professor Wilson, "On recent Improvements in the manufacture of Flax."**

## EAST INDIAN EXHIBITION.

**At the special request of the Council, Mr. Winkworth, Chairman of the East Indian Exhibition Committee, has recently visited the Hague and Leyden, in company with Mr. Roney, for the purpose of soliciting the aid of the Dutch Government in favour of the Indian Exhibition; and to request permission of His Majesty the King of the Netherlands, that selections from the very valuable and unique collections of Eastern articles, preserved in the museums of the Hague and Leyden, might be entrusted to the Society for the purpose of being exhibited in the "East Indian department of the Great Dublin Exhibition."**

**At the meeting of the Council, on the 16th inst., Mr. Winkworth reported the complete suc**

cess of his mission, and stated that the request with which he was charged, had been granted in the most gracious and liberal manner.

The following letter from Mr. Winkworth, and the official reply of M. de Thorbecke to the application of Messrs. Roney and Winkworth, will be read with interest; and the Society may with reason be congratulated on the manner in which their request has been met by the Dutch Government, which, at the same time that it adds a most valuable and important contribution to the increasing collection of Eastern productions, forming by the Society, affords a gratifying example of the friendly interchange of international civilities.

(TRANSLATION.)

The Hague, March 5, 1853.

GENTLEMEN,—I have received the catalogue of the Eastern objects contained in our Museums, which you desire to exhibit in the Industrial Exhibition which is shortly to take place in Dublin.

The Government of His Majesty the King of the Netherlands, is happy to be associated in an enterprise which has the approbation of Her Majesty the Queen, His Royal Highness the Prince Albert, and the British Government, and which cannot fail to lead to the most beneficial results.

It is therefore with pleasure, Gentlemen, that I comply with your request, and shall place in your hands the articles in question, during the Exhibition.

I have entrusted M. Van de Kasteele, the Director of the Royal Museum at the Hague, with the care of conveying and accompanying these articles. It is understood that all the cost of packing and transit, both to and fro, as well as the expenses of M. de Kasteele, are to be defrayed by you.

The Minister of the Interior,
(Signed) THORBECKE.

To Messrs. C. P. Roney, Esq.,
Secretary to the Industrial Exhibition at Dublin; and
T. Winkworth, Esq.,
Treasurer of the Society of Arts, in London, and Chairman of the East Indian Exhibition Committee.

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Paris, March 11th, 1853.

DEAR SIR,—I have the pleasure to announce to you the successful termination of the mission of Mr. Roney and myself to the Hague.

Immediately on our arrival, we put ourselves in communication with Sir Ralph Abercromby, Her Majesty's Ambassador to the King of the Netherlands, by whom we were honoured with an interview the same evening. We stated the object of our visit, into which his Excellency cordially entered, and promised us all the assistance which his position afforded.

We accordingly received from him, on the following day, an introduction to the Minister of the Interior, M. Thorbecke.

We explained to him the wish of the Society of Arts to have the means of adding to their intended contribution of a collection of Indian and Eastern products, to the "Great Industrial Exhibition, of 1853," in Dublin, a selection from the celebrated Museums of Holland, of objects of Japanese manufacture and design. This desire, we represented, was the greater, from it being well known that the Collection at the Hague is unique, possessing also an historical interest, owing to the early connection of the Dutch with Japan, Java, and other Oriental settlements. We stated that the proposed Exhibition, though originating with, and being at the sole expense of, a patriotic individual, Mr. William Dargan, was not a commercial speculation; but, being placed under the entire management of an independent Committee, had received great encouragement from her Majesty the Queen, the Prince Albert, and the Government of Great Britain.

His Excellency listened with attention; and after a short discussion, requested us to visit the Museums at the Hague and at Leyden, and to give him a list of the articles we thought most suitable for our purpose.

While doing this, we availed ourselves of the advice and assistance of the Directeur du Musée Royale, M. Kasteele, and finally presented to M. Thorbecke the catalogue he required.

We received shortly afterwards a verbal message of consent to our application on behalf of the Government, and which has subsequently been confirmed in writing, as will be seen on reference to the accompanying copies of the correspondence.

It now only remains for me to bear grateful testimony to the kind assistance received from Sir Ralph Abercromby and M. Kasteele, and to congratulate the Society of Arts on having been the medium of obtaining the loan of a valuable collection of curiosities, no portion of which has ever before been permitted, since its formation, to leave the shores of Holland. I am, dear Sir,

Yours truly,
THOMAS WINKWORTH.

Edward Solly, Esq., F.R.S.

## NOTICE TO INSTITUTIONS.

The Society has received through Messrs. W. and F. G. Cash, the publishers, a number of copies of a work by the late M. Frederick Bastiat, Member of the Institute of France, intitled "Essays on Political Economy," for distribution to the Institutions in Union. They will be inclosed in the next parcel.

## HOME CORRESPONDENCE.

### DUTY ON PAPER.

SIR,—The Circular issued by the Council on the suggestion of the Institute's Committee, the recent Lecture on the manufacture of paper, and the discussion which ensued, induce me to believe that a few remarks on the repeal of the duty may not be inopportune, the subject being evidently under the consideration of the Society.

The question may be treated in three aspects, as it affects paper-makers, the middlemen, and the public. One peculiarity of the paper-manufacture is, that by its means an article which otherwise would be useless is converted into a commodity of great utility and considerable value. The prices of rags, rope, bagging, &c., I understand are about 35*s*., 24*s*., 16*s*., 8*s*., and 4*s*., per cwt., according to the quality; and when, by industry and skill, they assume a new form, the Government requires payment of a duty of from 50 to 350 or 400 per cent. upon their value as raw materials, such raw materials depending upon the fact of the existence of the manufacture for their having any value at all. If we take the paper when made, the duty being at a fixed rate per pound (1½*d*. and 5 per cent.), without distinction of quality, it occurs that on the intrinsic value of the manufactured article the proportion of duty varies from 50 to 17 down to 5 per cent. Consequently, before some descriptions of goods can be brought into the market more than three times the worth of the raw material, and half the value of the manufactured paper, must have been paid in cash as duty to the Government; and this applies particularly to the inferior class of papers. It thus appears that for every 1,000*l.* paid for materials, the maker must estimate a further expenditure for duty, varying from 1,000*l.* to 2,000*l.*, before he can realise the result. This is a very heavy tax upon his capital. Not only does the duty cripple the manufacturer, by causing a large demand upon his resources for cash, but further, the constant recurrence of visits from an inexorable creditor gives rise to a false competition in the trade. I will illustrate this point by a case not at all unfrequent:—A paper-maker has to prepare for the visit of the Excise-collector; the duty must be paid to the day, nay, to the hour; he may have stock. paper, &c., one hundred times the value of the duty, but from various circumstances it may not be convenient to pay so large a sum in cash. The case, however, being imperative, what is his position? He is at the mercy of the moneyed purchaser,—such being always to be found, though at very reduced prices; and the latter is thus enabled to introduce goods into the market considerably below their just value. If there were no duty, the necessitous might be compelled to sell below the fair price; but it cannot be questioned that the periodical drain of a large amount of cash, causes the anomalous, but nevertheless certain fact, that paper may be frequently bought cheaper than it can be profitably manufactured. An end comes in any given instance; but other cases arise, and they all tend to the injury of the manufacturers, who pay the duty and their other demands. If a return could be obtained from the Excise-office, setting forth the number of persons proceeded against for non-payment of duty, and those prosecuted for frauds in attempting to evade the duty, I have no doubt it would be found that ten come under the former class, to one under the latter. Manufacturers who have large capitals are not thus inconvenienced, and therefore do not advocate a repeal of the duty; but these remarks are applicable to a very large proportion of this industrious community. The views of the larger makers are influenced by the fear of competition with the continental manufacturers, who pay an import duty of 4½*d.* per pound, and five per cent. The repeal of the duty would cause such an impetus to the manufacture, and would so release capital, that the result, except perhaps in some few instances, would not be deleterious; even if it were so, I may be allowed to express my opinion, that in obedience to those great laws of natural adaptation, if we cannot compete with other nations, the manufacture must cease to be regarded as a speciality of this country; if we cannot make as cheap as others, it is not our mission to manufacture for the world. As Belgium, France, and Spain, prohibit the exportation of rags, it would be just, in the event of the Customs duty being taken off, to insist upon their opening the trade in rags, otherwise the paper-makers of those countries would enjoy a bounty in the shape of cheap material at the expense of the other inhabitants of the respective nations. The manufacturer is also subject to inconveniences from the Excise regulations, the principal being the delay which takes place in consequence of the notices for charging, the time the paper is required to be kept after charging, before removal is allowed, in order that a superior officer may have an opportunity to re-weigh, &c. The infringement of these regulations, even when no duty is lost, renders the offender liable to penalties.

Yours, &c.,
WAIMA.

## DUTIES ON PAPER, NEWS, ETC.

SIR,—The repeal of the fiscal restrictions on paper, advertisements, news, and foreign books, must be a subject of interest to the Society of Arts, now that it has established a Journal of its own. That such taxes exist, apart altogether from the question of their amount, is a reflection upon our age and country; nor does it require any rhetorical arts to render patent to all the grossness of a financial system which opens the ports for the sake of our bellies, but stints and deteriorates the food of our minds. We are told, by higher than human authority, that "man doth not live by bread alone;" and if the people are excluded, by unequal laws, from the enjoyment of sound knowledge as widely and as cheaply disseminated as possible, who are bound to come forward and befriend them? I say the learned Corporations, Societies, and Institutions with which this country is so abundantly provided, and who are the natural guardians of the intelligence of the nation,—the public at large have hardly yet learned to carry the principle of agitation for reform into matters affecting their intellectual wants, and the interests that have grown up under a vicious system are more or less afraid of encountering changes the exact results of which they cannot foresee. Yet to men of enlightened minds, it cannot at this time of day be doubtful that literature, like everything else, must be benefited by the removal of fiscal restrictions; and in a philosophical point of view, taxation of the products of human thought is even more odious than that on food, or air, or light. It may be argued, that as the different bodies for the promotion of science and art are divided into specialties, they are precluded from ranging beyond the subjects which fall within their respective provinces; that the civil engineers should confine themselves strictly to civil engineering, the Geographical Society to geography, and the antiquarians to antiquities. But surely a common interest, which touches them all in a greater or less degree justifies a common concern with regard to it; nor should any department in the circle of knowledge be indifferent to what presses injuriously on the whole We are told by foreigners, and we flatter ourselves that in this country the art of combination for public objects is better understood than in any other part of the world; yet it seems strange that with such an organisation as we possess, ramified into every section of the field of science, the tax-gatherer should still be permitted to take toll upon the intelligence of the community. Mrs. Jellaby was so pre-occupied with the correspondence and cares of her South African mission, that her domestic affairs were left entirely to find their own solution, which they did in the bankruptcy of her husband and in her children's rags. I am afraid it is undeniable that our learned bodies have all more or less of Mrs. Jellaby about them, the characteristics of that respectable female becoming more manifest with their age and exclusiveness. [Strange indeed are the means by which the march of intellect is carried forward. Not to travel out of the present time, we find stately commissions issuing from the Crown to reform the abuses of our great Universities, educated and enlightenened enough, one would fancy, to render any interference of the kind impertinent. We see, too, a poor schoolmaster, strong only in the justice of his cause, squeezing from a rapacious capitular body funds dedicated to instruction which they had misappropriated, and then lifting the veil sufficiently to show that his is but one illustration of a wide-spread system, in which money set apart for the education of the people has been swallowed up by the Church. Look back a little along the high stream of public intelligence, and what do you behold? A mighty contest as to how the youth of the nation shall be taught, and the ministers of every religious denomination engaged so furiously in the struggle, that the powers of ignorance retain their old ascendancy. Over that contest, the learned bodies of the country have coldly held aloof, and if ever it is decided satisfactorily to the community, it will probably be by the ratepayers taking the question into their own hands and settling it, as they have already done in some districts of the North.]

To one who considers all these matters attentively, the only wonder is, that we are as well informed as we find ourselves— that public intelligence is so matured, and in so sound and healthy a state. How is this mainly to be accounted for? Not certainly by the agency of University Drones, and sleepy Societies that prose and maunder their time away, read dreadfully heavy papers at their hebdomadal meetings, and publish once a year unsaleable transactions. A great power has arisen in this free kingdom during modern times, and spread throughout the world, dedicated to the public service—potent for good—comparatively impotent for evil—moulding opinion, directing and stimulating progress; informing and elevating society. These are its aspirations at least, and no one can doubt that they have been partially realised. That power is the press—a mighty influence—struggling through contempt, hatred, and indifference, to be the instructor of nations, and to right mankind. It has suffered dire persecution, and still bears the burdens of many wrongs—imprisonment, suppression, exile, fine, abroad—ruinous taxation, and indirect oppression at home. The hand of Government is heavy upon it everywhere; and even here, what the censor and the policeman spare, the exciseman plunders. By its aid we have won many of our dearest and most precious privileges; yet who is grateful, or helps it in return? What have our learned and scientific bodies, our Associations to promote the Arts, done for the Press? Where is that intelligence, that liberal high-mindedness which might be expected in such Institutions? Have they averted the operation of laws which leave no alternative to Journals between degrading dependence and arrogant monopoly; which lower the social status of Journalists; which stint the amount, and deteriorate the quality of public news. We are told, that if the press were free the government of the country would be an impossibility; and I am willing to admit that the sense of intolerable wrong has made its tone sometimes too rampant, yet why fear the increased action of a power which has heretofore been so salutary? It has been universally conceded that former reductions of the burden of taxation upon the press have been invariably followed by a vast improvement in its character, by more elevated views on all social questions, and a juster and more moderate treatment of whatever provokes its opposition. No sensible man can doubt that that would continue to be the case were the taxes on knowledge entirely removed, and that public opinion is sufficiently powerful to correct, in its own organs, any abuses or errors into which from time to time they may fall.

We have adopted, without much consideration, very exaggerated notions as to the excellence of the press of this country. Yet, is it what it ought to be? What proportion of our journals, I should like to know, is independent of party or clique, or class interest, or personal ambition, or some other influence damaging to the character of such undertakings? Is it not the case that some of them do not pay their expenses; and why, and how, are they kept up if they are losing concerns? It cannot be doubted that a system which leads to the support of journals, that as commercial speculations do not answer, is inherently vicious. The known pecuniary dependence of some, throws a slur upon the character of all. Journals, that are self-supporting, can screw down their staff to the same scale of remuneration as that of journals which live upon the crumbs of official favour; or the gossip of the clubs, or the superfluities of capitalists, with a mania for political influence. Journals that are not self-supporting, eke out their miserable subservient existences in a variety of ways. Some levy toll upon the vanities of the fashionable world, and the aspiration of new-born wealth to get a footing there; others are reproduced under another title, and the stale matter is sold at the same price as if it were original. Puffing advertisements still find their way into many, under the guise of an editorial sanction. The privilege of theatrical admissions is converted into a wholesale system of bribery and touting for advertisers. Books sent by publishers to be reviewed (a large proportion of which are never noticed), become an important perquisite, and therefore criticism loses all its vigour and usefulness by being disarmed of its censures. Some journals suffer from a plethora, and are obliged to keep down their circulation to prevent apoplexy; others are starving in the midst of abundance, and but for unblushing piracy would die miserably for lack of matter, I cannot call it food. The avowed regard for quantity rather than quality, I take of itself as an evil in the present state of the press; which can hardly be exaggerated; for it imposes a heavy burden upon the time of readers, who have to wade through a deluge of trashy verbiage in order to avoid missing what is really important or interesting. The limits of a letter warn me to contract my observations on this branch of the subject; yet there is so much to find fault with, that I hardly know where to stop. I might show how the Press, driven by its dependent and fettered condition to do so, has given an exaggerated attention to political rather than social questions,—how industrial interests have been neglected by it,—how, with a few exceptions, the useful distribution of its powers and the desirable variety of its forms and materials have been neglected. I might take the Daily, the Weekly, and Provincial Press in succession, and point out their shortcomings,—and perhaps in that survey the feeble little bantling organ of this Society might not escape observation. The baneful influence of the Taxes on Knowledge as they are called is everywhere visible; and the public mind, that ought to be nourished with the best and most wholesome intellectual aliment, is in the main condemned to feed on a coarse, stale, and dear *réchauffé* of news. If you want a clear and convincing proof of this, look at the systematic and unblushing piracy of articles resorted to,—the unscrupulous use of paste and scissors,—so long practised, that people seem actually to have lost all perception of its immorality. The public are deeply interested in the power, the purity, the independence, the originality, and the cheapness of Journalism. The learned bodies, and the Societies and Institutions, into which the intelligence of the community is collected, are just the parties who can and should combine to emancipate the Press. The Society of Arts especially is marked out for this work, and I am glad to see it is about to undertake it. I find, from the last Report of the Royal Commission, that there are in and around this metropolis about 100 Institutions, having an annual revenue of 160,000*l.*, devoted to the promotion of Science and the Arts. I find that this Society itself is now in union with 259 Local Institutions spread all over the country. Why should this immense organization not join together to set Knowledge free? In such a cause their union would be irresistible,—their success the triumph of a noble principle; and they would give to the public a guarantee much needed,—that useful and practical results are sometimes to be got out of learned bodies.

I am, Sir,
Your obedient Servant,
A NEWSMONGER.

STATEMENT SHOWING THE EXTENT OF THE PRESENT FISCAL RESTRICTIONS ON PAPER, ADVERTISEMENTS, AND NEWSPAPERS, BORNE BY THE PRINCIPAL INSTITUTIONS OF MANCHESTER:

| | *Athenæum.* | | | *Mechanics' Institution.* | | |
|---|---|---|---|---|---|---|
| Paper duty— | £ | *s.* | *d.* | £ | *s.* | *d.* |
| Newspapers . . . . . | 26 | 9 | 6 | 11 | 0 | 6 |
| Books and Periodicals . . | 6 | 5 | 3 | 7 | 6 | 0 |
| Stationery, Schoolbooks, &c. | 11 | 7 | 9 | 16 | 3 | 0 |
| | 44 | 2 | 6 | 34 | 9 | 6 |
| Newspaper Stamps . . . | 65 | 0 | 0 | 31 | 4 | 0 |
| Advertisement Duty . . | 9 | 0 | 0 | 10 | 0 | 0 |
| Total per Annum . | 118 | 2 | 6 | 75 | 13 | 6 |

Of 300 English Newspapers received weekly at the Athenæum, only 96 are transmitted through the post. Of 144 received at the Mechanics' Institution, only 41 are received through this channel. The stamp is of little value for postal purposes, as Newspapers are supplied at the same cost to the Institution as when transmitted by the Newsvender's express parcel.

J. W. HUDSON, PH. D.
*Lancashire and Cheshire Institutional Association.*

## LUCIFER MATCHES.

SIR,—I have just received, from a Lucifer-match manufacturer, a box of Lucifer-matches, in the production of which the red, or amorphous phosphorus, is used, instead of common phosphorus.

The importance of this communication will appear from the following facts:

It has been estimated, that the English and French manufacturers of phosphorus are now producing at the rate of 300,000 lbs. of common phosphorus per annum, nearly the whole of which is consumed in making Lucifer-matches.

In compounding the emulsion for tipping the matches, the German manufacturers make three pounds of phosphorus suffice for five or six millions of matches. If we suppose only one-half of the French and English annual product of phosphorus to be employed in making matches, this will give us 250,000 millions of matches as the annual product consequent on the consumption of one-half of the French and English phosphorus.

We need not suppose this to be an exaggerated statement, when we consider the daily product of some of our match manufactories. I have lately had occasion to describe the processes of a London factory, which produces 2,500,000 matches daily. For this purpose, 14 3-inch planks are cut up; each plank produces 30 blocks; each block—of the dimensions, 11 inches long, 4½ inches wide, and 3 inches thick—produces 100 slices; each slice, 31 splints; each splint, 2 matches: thus, we have $14 \times 30 \times 100 \times 31 \times 2 = 2{,}604{,}000$ matches, the day's work of a single factory in London. At Messrs. Dixon's factory, near Manchester, from 6,000,000 to 9,000,000 of matches are produced daily.

There are, at least, four very considerable makers of Lucifer-matches in London and its vicinity, and a large number of small makers. There are also manufactories, of varying degrees of importance, in many of the large towns of this kingdom, the largest being that at Manchester, above named.

On the continent of Europe, manufactories of matches have spread in a remarkable manner from Transylvania, on the borders of Turkey and near the Black Sea, to the inland lakes of Sweden, and the Finland shore of the Gulf of Bothnia. In the United States of America, and in Central America, these factories are also to be found. The trade is most flourishing in Germany; and, in order to encourage it, some of the governments sell the timber of their forests at a merely nominal price. The German export-trade is rapidly increasing. The manufacturers have their agents stationed wherever there is a considerable demand for matches. Large quantities are imported into this country; and being well packed in cheap but substantial cases, they are carried by the railway companies as *toys*, while the produce of our own manufactories is frequently refused to be conveyed.

In the manufacture of Lucifer-matches, the splints are first tipped with sulphur, and then with a composition formed of phosphorus, chlorate of potash, and colouring matter mixed up with glue. This composition is spread out upon a stone slab, heated by steam, and the matches, mounted in frames to keep them separate from each other, have their ends dipped into this composition. The matches are then dried in a hot room, and afterwards packed in boxes for sale.

All the persons engaged in the factory are thus, more or less, exposed to the fumes of phosphorus. The effect of this exposure is to induce a disease which, to quote the description of a medical man, "is of so insidious a nature, that it is at first supposed to be common toothache, and a most serious disease of the jaw is produced before the patient is fully aware of his condition. The disease gradually creeps on, until the sufferer becomes a miserable and loathsome object, spending the best period of his life in the wards of a public hospital. Many patients have died of the disease; many, unable to open their jaws, have lingered with carious and necrosed bones; others have suffered dreadful mutilations from surgical operations, considering themselves happy to escape with the loss of the greater portion of the lower jaw."* I will not shock your readers with any further surgical details. I will merely remark that, at the present time, and in one factory, a young man and a young woman have resumed their work, each with the loss of the lower jaw; and I am assured that such cases are by no means uncommon, as our hospitals and infirmaries can testify.

Now, what is the remedy for this fearful state of things? Improved ventilation of the factories, habits of cleanliness and temperance on the part of the operatives may mitigate the evil; but when it is stated that the clothes of the persons engaged in the dipping-room, and the hands of the children engaged in boxing the matches, present a luminous glow in a dark room, it is evident that plans for improved ventilation, &c., will not insure impunity to persons thus exposed to the fumes of phosphorous acid during sixty or seventy hours per week. A number of small makers, occupying garrets and kitchens, are, it is to be feared, constantly exposed to these noxious fumes.

Nor is the jaw disease necessarily confined to the poor operatives. We have heard of children having taken it simply by playing with the matches; others have been killed by sucking them: but, in this case, orpiment (one of the sulphurets of arsenic) had probably been used as an ingredient in the composition instead of sulphuret of antimony. But there is, perhaps, not a house in the kingdom—scarcely a room—that is not supplied with its box of Lucifer-matches, each box presenting 50 or 100 points of phosphorus, scarcely protected by the thin coating of indurated glue from the oxidising influence of the air. The public is also exposed to fumes, which, though slight, are constantly present, and must be more or less injurious to health.

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* Mr. Harrison, in the "Dublin Quarterly Journal of Medical Science," for August, 1852.

The Lucifer-match is a simple, beautiful, and efficient contrivance, the result of a long series of improvements on the old sulphur-match of the tinder-box; and it owes its present efficiency, for the most part, to phosphorus. But the chemistry which contrived the Lucifer-match can surely do something to arrest the progress of the frightful disease consequent on its manufacture? A few years ago, M. Schrötter announced the discovery of amorphous phosphorus,—a substance as unlike the common crystalline phosphorus as the sparkling diamond is unlike a lump of black charcoal. The amorphous phosphorus is not soluble in sulphuret of carbon, as common phosphorus is; does not ignite under ordinary friction, or in contact with iodine, as is the case with the common variety; is not poisonous; exhales no injurious acid fumes on exposure to the air. It is, in fact, as distinguished for negative qualities as the ordinary kind is for positive qualities; and yet, when mixed with certain substances and exposed to friction, it explodes with violence. This, then, would appear to be the substance eminently calculated to replace common phosphorus in this manufacture; and when this amorphous phosphorus was first introduced, there was a general expression of admiration at the marvellous powers of chemistry which could thus deprive a substance of all its active noxious properties, and yet leave that substance the same elementary body as before, with the same atomic weight and the same combining powers. In July, 1851, a process was patented, and arrangements were made for manufacturing the amorphous phosphorus on a large scale. Specimens of the new article were sent to the large Lucifer-match manufacturers of this country and of the Continent; yet, up to the present time, no manufacturer has adopted it. In writing on this subject, in a recent Number of my "Cyclopædia," I thought myself justified in condemning the supineness of the manufacturers, and their indifference to the sufferings of their operatives. On submitting my censures to Messrs. Dixon, of Newton-heath, near Manchester, who are probably the largest manufacturers of Lucifer-matches in the world, they assured me of their anxiety to adopt every available means that might be conducive to the health and comfort of their workpeople; and that if they had not yet made use of the amorphous phosphorus, it was simply because they had not been able to make it succeed. In a letter, dated Feb. 7th last, they say: "Whatever future results may be produced from further experiments, we cannot pretend to say, but trust to chemical science to remove the dreadful disease arising from the use of the present phosphorus."

The difficulty in the use of the amorphous phosphorus has been to combine it with other ingredients, so as to produce a paste capable of igniting quietly with moderate friction, and not with those explosive bursts of flame which mark the free use of chlorate of potash. I am happy to be able to state, that the Messrs. Dixon, not deterred by former failures, and even danger from explosions, have, since the date of their last letter to me, succeeded in producing matches which do fulfil the above conditions to so great an extent, as to warrant the hope that in the course of the present year the public will be supplied with matches made with the amorphous phosphorus. The specimens now before me contain a little too much chlorate of potash; with moderate friction they burst out into a white flame, which, however, kindles the wood well. These matches, although not perfect, have the following decided advantages over the common matches: they produce no light in the dark under 400°; they have no smell; are not liable to contract damage, and may be placed on a hot mantel-shelf without taking fire. They are thus adapted to moist and hot climates, and will keep for any length of time without change.

I must apologise for the length of this letter. If the public will take an interest in the manufacture of amorphous matches, the time is not very distant when that form only will be tolerated; and thus the interests of humanity will be served by the extermination of a cruel disease, and the introduction of a safer and better article of domestic use. Yours, &c.,

CHARLES TOMLINSON.

Bedford-place, Ampthill-square, March 8, 1853.

## LIBRARIES IN PROVINCIAL TOWNS.

MANCHESTER has a larger number of Libraries than any of our provincial towns. The following return has been compiled by Dr. J. W. Hudson for this Journal:

LIBRARIES.

| | *Public and Subscription.* | *Private Circulating.* | *Total.* |
|---|---|---|---|
| Manchester | 42 | 19 | 61 |
| Liverpool | 26 | 12 | 38 |
| Birmingham | 16 | 5 | 21 |
| Leeds | 14 | 6 | 20 |
| Newcastle-on-Tyne | 8 | 6 | 14 |

The Libraries of Manchester consist of

| | | |
|---|---|---|
| 42 Private Circulating Libraries, containing | | VOLS.<br>35,000 |
| 16 Public Libraries, viz.: | VOLS. | |
| Athenæum | 15,000 | |
| Cheetham College (Free) | 21,000 | |
| Free Library, Manchester | 22,000 | |
| „ Salford | 11,000 | |
| Harpurhey | 250 | |
| Lyceum, Ancoats | 3,250 | |
| Mechanics' Institution | 15,000 | |
| „ Chorlton-road | 500 | |
| Miles Platting Mechanics' Institution | 2,000 | |
| Philosophical Institution | 200 | |
| Portico | 14,500 | |
| Salford Mechanics' Institution | 3,000 | |
| Subscription—Old Library | 30,000 | |
| „ New Exchange | 18,000 | |
| „ New Newalls B. | 21,000 | |
| Young Men's Christian Association | 1,500 | |
| Special Libraries: | | 178,200 |
| Law Library | 4,000 | |
| Medical, ditto | 2,000 | |
| Foreign, ditto | 7,000 | |
| | | 13,000 |
| VOLUMES | | 226,200 |

## LOWERING BOATS.

SIR,—I have had the pleasure of submitting to your Society a model of a pair of self-acting hooks, the principle of which is, that instead of the fulcrum or pivot being at the end of the shank, it is placed near the middle, and a ball at the opposite end causes the hook to reverse itself, and detach any object suspended by it.

Let any of the readers of your Journal take a fishing-hook, remove the barb, drill a hole through the centre of the shank, and put a pin through it; a moderate sized shot at the top of the shank will cause the hook to capsize or turn over, when the object suspended by the hook touches the ground or other support. I propose to adopt the principle to the lowering and detaching of boats from ships in case of accident or otherwise, much loss of life having resulted from the boats remaining attached to the ship. The advantages of this arrangement are, first, that it is cheap, costing but a few shillings; and secondly, that it is extremely similar to the present hook, and that sailors would require no instruction in using it. A small pin can easily be inserted to prevent the hook detaching when the boat is hanging at the davits. I am, Sir, yours, &c.,

C. Butler Clough.

## PROCEEDINGS OF INSTITUTIONS.

Annan.—The Fifth Annual Soirée of the Mechanics' Institute was held in the Lady-street Assembly-rooms, on the evening of Friday, the 4th inst. Festoons of evergreens decorated the walls and chandeliers, and an arch of laurel spanned the upper end of the room, from which was suspended an imperial crown of mosses and evergreens. Several appropriate mottos were attached to various parts of the walls. The audience was very large. Col. Dirom, of Mount Annan, occupied the Chair. James Little, Esq., Vice-President, read two letters—the one from William Ewart, Esq., M.P., Vice-President, and the other from Lord Drumlanrig, M.P. for the county. Both expressed their inability to be present, and their best wishes for the success of the Institute. He then read the Report, which stated that the Library had during the last year been considerably increased, and that for the last twelve months there had been a News-room in connection with the Institute, which was supplied with nearly forty papers a week, and was well frequented. During the last quarter there had been an increase of eighty in the number of members over any quarter since the Institute was established. There had been twelve gratuitous Lectures upon interesting subjects, which were well attended. These Lectures were—"Introductory," by the Rev. J. J. Wood, A.M.; "Labour, Wages, and Money," by A. Davidson, Esq.; "Footsteps of the Danes and Northmen in Cumberland and the Border," by R. Fergusson, Esq.; "Every Man his own Landlord," by Rev. H. Mc. B. Brown; "The Art of Oratory, with Illustrations," by F. B. Calvert, Esq., A.M.; "The History of the Kingdom of Hungary," by Major Monins; "Contemporary Sovereigns of Europe," by the Rev. P. Hope, B.A.; "True Greatness of Character," by the Rev. J. Gordon; "Means and Ends," by Mr. Thomas Johnstone; "The Credibility of Craniology," by Robert Elliot, Esq., M.D.; "Annan—Ancient and Modern," by Jas. Little, Esq.; and "John Howard," by the Rev. Jas. Gailey. The following gentlemen then addressed the meeting—the Rev. Mr. Wood; Sheriff Trotter; the Rev. Mr. Riddell; R. Fergusson, Esq.; Dr. M'Culloch. The Chairman, in reply to the vote of thanks which had been passed, said he was happy to have an opportunity of stating how sensible he was of the benefits resulting to the working man from such Societies as the Annan Mechanics' Institute.

Camberwell.—On Tuesday evening last a Lecture was delivered before the members of the Athenæum, by Mr. P. Le Neve Foster, "On Photography and its application to the purposes of Science, Art, and Utility." The Lecturer stated in a popular manner the principles on which the process depended, explaining the construction of the Camera Obscura, the difference between the "negative" and "positive" pictures, and showing how the latter is produced from the former, and copies may be multiplied indefinitely. The various methods of preparing paper and glass, including the collodion process, were adverted to and their peculiar advantages were noticed. The lecturer concluded by pointing out the application of the Art to the microscope, the registering of atmospheric phenomena to engineering and other useful purposes. The lecture was illustrated with apparatus and a variety of beautiful specimens including negatives, which attracted much attention. A vote of thanks to the Lecturer was passed unanimously.

Dunmow.—The second course of Lectures for the present season, at the Literary and Scientific Institution, was opened on Wednesday evening, February 16th, by the Rev. T. B. Sainsbury, B.A., London, with a Lecture on the "Catacombs of Rome," illustrated by upwards of forty large diagrams. The company expressed their gratification by repeated tokens of applause; and at the close of the Lecture the thanks of the meeting were voted to the Reverend Lecturer.

Halsted.—The Rev. J. C. Coleman, of Gestingthorpe, delivered a Lecture on "The Sea" to the members of the Halsted Mechanics' Institute, on Friday evening. He commenced by giving an analysis of the various substances contained in a glass of sea water, more particularly that of the British Channel, and explained the different degrees of saltness of sea water on our own shores in different seasons of the year. After alluding to the depth of the ocean, and to some of its principal inhabitants, as the whale and the shark, he dilated upon the proportions of sea and land composing the globe,—describing the results that would ensue, if instead of seven parts water and three parts land, it were in an inverse ratio, and how the fertility of the earth depended on what was termed the barren ocean. The tides, the action of the moon upon the waters, the attraction of the sun, and the flow of the tides in different parts of the world, were next explained; and the Lecturer then described the law of storms, whirlpools, and waterspouts. In acknowledging a vote of thanks, which was carried by acclamation, Mr. Coleman remarked that by "teaching we learn, and thought delivered is more possessed."

Plymouth.—On Wednesday last, Mr. Gore delivered a Lecture, at the Mechanics' Institution, "On the Coal-fields of this Kingdom," illustrated by a variety of plans and sections of various coal-pits, and by models of the engine-house, and mode of raising coal from the pit, and of the machinery, &c., connected with the operations of the miner, and the manufacture of coke. On Friday last, Mr. J. A. Hardcastle, late M.P. for Colchester, read a paper "On the History of the English Language," in which he traced the rise and gradual progress of the language. The subject was illustrated by readings from various authorities, which were afterwards carefully analysed, for the purpose of pointing out the different proportions of words in use, derived from the Celtic, the Anglo-Saxon, the Norman-French, the Greek, and the Latin tongues.

Sevenoaks.—On Thursday, March 10th, Mr. Yapp delivered a Lecture to the members and friends of the Literary and Scientific Institution, on "Drawing and its Uses, with Hints on Taste and Ornamental Design;" being the first Lecture delivered at this Institution through the medium of the Society of Arts. In the course of the Lecture, Mr. Yapp made some remarks upon several articles sent to the Great Exhibition, treating largely upon the principles of design, and the application and misapplication of ornament. It is hoped that this Lecture will stimulate the Committee to consider the propriety of establishing a Drawing-class in connection with the Institution.

TONBRIDGE.—On Friday, the 11th inst., Mr. Yapp delivered his Lecture, "Drawing and its Uses," to the members of the Literary Institution. The Lecturer remarked that the want of artistic education of the eye and hand in this country was the main cause why we did not furnish designers equal to our neighbours; and yet nothing could be more easily acquired than a power of drawing. In explaining different objects to children, it was found almost impossible to convey correct notions except by these means; at all events, they were far simpler and more comprehensible than mere words

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

*Sevenoaks.*—*Vide* Advertisements in Nos. 1 and 2 of the Society's Journal.

H.'s Letter on the Decimal Currency next week.

## QUESTIONS FROM CORRESPONDENTS.

*Bookbinding.*—Is there any self-acting machine used by bookbinders for sewing the sheets together; and if so, is it a patent or not; and what is its name?—[*No.* 48.]

*Smoke Nuisance.*—What are the causes that prevent the carrying out of the Act of Parliament for remedying the smoke nuisance; and how is it possible to enforce that Act?—*R. W.* [*No.* 49.]

## MISCELLANEA.

INSTRUMENT FOR MEASURING STEAM PRESSURE.—Mr. Hulford, of H. M. Dockyard, Woolwich, has invented an instrument for ascertaining from an indicator-card the steam pressure on the piston of a steam-engine. The indicator-card being placed on the board so that the atmospheric lines coincide with the marks on the retaining springs, the triangular scale was placed at the bottom of the figure, and the side roller made to revolve until the spiral line on it intersected the edge of the scale, in which position the roller was fixed. The distances between the steam and vacuum lines were taken by sliding the scale along the figure, and ten or twenty divisions might be taken, according to the degree of accuracy required; the sum of the distances, divided by their number, gave the mean pressure on the piston. A great saving of time, in the measurement of all irregular figures, evidently resulted from the use of the instrument, and its simplicity and low price were also points in its favour.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 10th March*, 1853.
177. Hops—Accounts.
199. Ships (Navy)—Return.

*Delivered on 11th March.*
191. Local Acts—Reports of the Admiralty.
211. Bill—Pilotage.

*Delivered on 12th and 14th March.*
180. Children in Workhouses—Abstract of Return.
182. Turnpike-roads (South Wales)—Statements of Receipts and Expenditure.
204. Colonial Postage—Correspondence.
218. Committee of Selection—Third Report.
170. Railway and Canal Bills—Second Report from Committee.
208. Lighthouses, &c.—Copy of a Letter from his Royal Highness Prince Albert, &c.
212. Bills—Probates of Wills and Grants of Administration.
223. ,, —Aggravated Assaults.
Prisons in Scotland—Fourteenth Report of the General Board of Directors.

*Delivered on 15th March.*
171. Railway Accidents—Return.
203. Bridgenorth Election—Minutes of Evidence.
207. Electors and Polling-places (Scotland)—Return.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette*, 11*th March*, 1853.

*Dated 31st Jan.*
243. D. S. Brown—Improvements in barometers, &c.
248. R. Palmer—Cutting and reducing to pulp turnips and other roots, &c., and also crushing apples for cider.

*Dated 10th Feb.*
362. R. Roger—Motive power.

*Dated 17th Feb.*
411. J. C. Brown—Propelling vessels.
412. W. B. Adams—Railways.
418. T. C. Ogden—Spinning cotton, &c.

*Dated 22nd Feb.*
451. P. F. Gougy—Skidding wheels.
453. J. C. Cochrane—Production of figured fabrics.

*Dated 23rd Feb.*
455. J. Smith—Raising and forcing water, &c.
457. E. Albrecht—Transmitting and reflecting light.
459. R. Milligan—Washing slivers of wool.
461. A. Willard—Butter machine.

*Dated 24th Feb.*
463. J. Green—Economical self-basting cooking apparatus.
464. W. Spence—Thrashing and winnowing corn.
465. H. Walmsley and T. Critchley—Stopping railway trains, and communicating from one part of a train to another.
466. P. M'Lellan—Thrashing machinery.
467. W. Johnson—Manufacturer of caoutchouc. (A communication.)
469. T. De la Rue—Improvements in producing ornamental surfaces to paper, &c.
470. E. A. Hermann—Machinery for manufacturing woollen cloth. (A communication.)
471. J. Lawrence—Drying and preparation of malt, meal, seeds, corn, &c.
472. T. B. Jordan—Machinery for planing slate.

*Dated 25th Feb.*
473. F. Preston—Manufacture of machinery used in spinning cotton, &c.
475. B. Price—Construction of furnaces, &c., for heating and evaporating.
476. J. Grist—Machinery for manufacture of casks, &c.
477. W. Symington—Preserving milk, &c.
478. J. P. de la Fons—Skids and drags for omnibuses.
479. T. Richardson—Manufacture of compounds of phosphoric acid.
480. T. M. Nicholls—Emission or re-action engines.
481. A. F. Cossus—Filters.
483. F. Goodell—Distilling, bleaching, and deodorising rosin oil. (Partly a communication.)

*Dated 26th Feb.*
484. C. N Wilcox—Extracts from elder-tree.
485. J. J. Fréchin—Locomotive engines.
486. W. M. Shaw—Locomotive boilers
487. J. Brandeis—Manufacture and refining sugar.
488. M. H. Blanchard—Earthenware pipes, &c.
489, W. E. Newton—Indicating rotations of wheels. (A communication.)
490. E. Thornton—Kitchen boilers and flues.
491. Lord Berriedale—Weaving.
492. R. Griffiths—Propelling vessels.
493. C. Tetley—Power by steam and air.
494. C. Tetley—Manufacture of bobbins.
495. S. Varley—Communication between guard and engine driver.
496. Earl of Dundonald—Useful products by combination of bituminous, resinous, and gummy matters.

*Dated 28th Feb.*

498. J. Murphy—Railway trucks, &c.
500. M. J. Roberts—Manufacture of mordants, partly applicable to manufacture of a polishing powder.
502. G. Duncan—Steam boilers.
504. J. Major—Synovitic lotions.

*Dated 1st March.*

506. R. Stephenson, jun.—Locomotive engines.
508. J. Bethel—Preserving wood.
512. W. Rowett—The cylinder paddle-wheel.
514. J. M'Adams—Printing on leaves of books their designations, numbers, &c., &c.

*Dated 2nd March.*

516. L. Hill, jun.—Motive power. (A communication.)
518. H. A. Holden, A. Knight, E. Bull, and J. Banfield—Signals between guard and driver.
520. A. Soyer—Soyer's Ozmazome food.
522. E. D. Moore—Treating extract of malt and hops.
524. A. A. de R. Hely—Door or finger-plate.
526. M. Vetillart—Drying yarns.

*Dated 3rd March.*

528. W. Clark—Propelling and steering vessels.
530. S. O'Regan—Consuming smoke.
534. M. Billing—Metallic bedsteads.
536. S. Colt, A. Blower. (A communication.)
538. S. Colt—Rotating breech for fire-arms. (Partly a communication.)
540. W. E. Newton—Primers for fire-arms.
542. T. Crick—Manufacture of boots, shoes, &c.

### APPLICATION WITH COMPLETE SPECIFICATION FILED.

577. Revolving or repeating fire-arms.—7th March, 1853.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 12th March, 1853.*

251. Auguste Edouard L. Bellford, of 16, Castle-street, Holborn—Improvements in sewing machines.
287. Auguste Edouard L. Bellford, of 16, Castle-street, Holborn—Improvements in steam-boilers.
301. Samuel Smith, of Swinton, Manchester—Improvements in looms for weaving.
575. Pierre Bernardet de Lucenay, of Paris, France, and 4, South-street, Finsbury—Invention of the production of photographic images by means of artificial light.
982. Peter Armand le Comte de Fontaine Moreau, of 4, South-street, Finsbury—Improvements in constructing the bars of furnaces and grates. (A communication.)

*Sealed 16th March.*

53. Thomas Browne Dalziel, of Glasgow—Improvements in the treatment or manufacture of textile fabrics or materials.
56. John Finlay, of Glasgow—Improvements in grates and fireplaces, or apparatus for the generation of heat.
64. Henry Richardson Fanshawe, of Arthur-street, Old Kent-road—Improvements in shawls, scarfs, neckerchiefs, handkerchiefs, mantles, sails or sail-cloth, table-cloths and table-covers, napkins, and umbrella and parasol-tops and covers, and in an improved loom for weaving, applicable to the said improvements in respect to some of the said articles.
101. Thomas Allan, of Adam-street—Improvements in the application of carbonic acid gas to motive purposes.
106. Thomas Allan, of Adam-street—Improvements in propelling.
181. William Edward Newton, of 66, Chancery-lane—Improvements in governors, or regulators, for regulating the pressure of gas as it passes from the main or other pipes to the burners.
207. William Donald Napier, of George-street, Westminster, and William Lund, of Cornhill—Improvements in apparatus for steering vessels.
219. Arthur Richard Burr, of Halesowen, Worcester—Improvements in making gun and pistol-barrels, applicable to the manufacture of other kinds of tubes.
231. George Walker Nicholson, of Pendleton, Lancashire—Improvements in screw-bolts, nuts, and washers, and in the machinery or apparatus for making the same.
234. John Balmforth, William Balmforth, and Thomas Balmforth, of Clayton, Lancashire—Improvements in steam-boilers, and in fixing the same.
235. Adam and John Booth, of Manchester—Improvements in plaiting or braiding-machines, which machines are applicable to manufacturing webs for making door and other mats.
259. George Walker Nicholson, of Pendleton, Lancashire—Improvements in vices, and in the means or method used for fixing the same.
260. William Coles Fuller, of Bucklersbury, and George Morris Knevitt, of Argyll-street, New-road—Improvements in applying India-rubber or other similar elastic substances as springs for carriages.
262. Robert Mortimer Glover, and John Cail, of Newcastle-on-Tyne—Improvements in miners' or safety lamps.
286. Auguste Edouard L. Bellford, of 16, Castle-street, Holborn—Improvements in smoothing-irons.
305. John Talbot Tyler, of Mount-street, Grosvenor-square—Improvements in hats, and in the preparation of plush or other covering used in the manufacture of hats.
321. Samuel Hardacre, of Manchester—Improvements in machinery or apparatus for blowing, scutching, opening, cleaning, and sorting cotton, wool, and other fibrous substances, parts of which improvements are applicable to other purposes.
322. George Gent, and Samuel Smith, of Northampton—Invention of a fruit-cleaning and dressing-machine.
341. Edward Simons, of Birmingham—Improvements in lamps.
347. Auguste Edouard L. Bellford, of 16, Castle-street, Holborn—Improvements in sewing cloth and other materials.
354. Joseph Walker, of Dover, Kent—Improvements in machinery for crushing and bruising malt, grain, and seeds.
356. Joseph Robinson, of Southampton—Improvements in ventilators.
515. Robert William Mitcheson, of Garford-street—Improvements in anchors.
529. Robert William Mitcheson, of Garford-street—Invention of an improved safety hook.
588. Alfred Charles Hervier, of Paris, France, and 4, South-street, Finsbury—Improvements in the application of centrifugal force to propelling on water.
573. John Norton, of Cork—Improvements in blasting.
615. Charles Dickson Archibald, of Burland Hall, Milnthorpe, Westmoreland—Improvements in lighting and heating.
739. Amory Hawkesworth, of Abbey-road, Torquay, Devon—Improvements in lifeboats.
1120. Jean Baptiste Niomier, of Rue de Marseille, and Charles Constant Boutigny, of Rue de Flandre, of La Vilette, France—Improvements in distilling fatty matters.
1182. James Webster, of Leicester—Improvements in the manufacture of springs.
64. Michael Fitch, of Chelmsford, Essex—Improvements in ovens.
74. Thomas Cottrill, of West Bromwich, Staffordshire—Improvements in the manufacture of certain salts of soda.
92. William Brown, of Glasgow—Invention of an improved method of treating coal and bituminous substances, and for improvements in the treatment of their volatile products.
94. Edward Wills Wren, of Walkhampton, Devonshire—Invention for the manufacturing of bricks, pipes, tiles, imitation stone, and peat bricks for fuel, by means of a machine and arrangements of machinery, titled a central circular and horizontal motion.
103. James Stewart Kincaid, of Dublin—Improvements in ascertaining and registering the number of persons entering or quitting omnibuses or other vehicles or vessels, which are applicable in whole or in part to buildings or other places.
108. Peter Alexander Halkett, of Richmond-hill—Invention of an improved construction of inkstand.
117. Henry Henson Henson and William Frederick Henson, of Hampstead—Improvements in signalling on railways, and in the apparatus used therein.
125. Peter Fairbairn and Samuel R. Mathers, of Leeds, Yorkshire—Improvements in machinery for drawing the sliver and rove of flax, hemp, and tow.
129. William Vincent, of Noakes and Vincent, of 195, Brick-lane, Spitalfields—Improvements in cocks or taps.
131. Joseph Rock Cooper, of Birmingham—Improvements in firearms.
144. William Riddle, of East Temple-chambers—Improvements in ornamenting walls, ceilings, and other surfaces.
153. James Middlemass, of Edinburgh—Invention of the application of a new material to the construction of portable houses and other buildings.
160. John Chubb and John Goater, of St. Paul's Churchyard—Improvements in locks and latches.
177. John Randolph and John Elder, of Randolph, Elder, and Co., of Glasgow—Improvements in propelling vessels.
188. John Sangster, of Cheapside, City—Improvements in umbrellas and parasols. (A communication.)

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| March 11 | 3431 | Improved Sausage-machine | William Brookes | 7, Little Somerset-street, Aldgate. |
| ,, 16 | 3132 | Seamless Block Boot | George Clarke | Kingston-on-Hull. |

# SOCIETY OF ARTS.

**FRIDAY, MARCH 25th, 1853.**

**Memorial** of the Council of the Society for the Encouragement of Arts, Manufactures, and Commerce, to the Lords Commissioners of Her Majesty's Treasury,

Sheweth,

That your Memorialists hear with great satisfaction that Her Majesty's Government have under their consideration the question of introducing into this country a system of decimal coins, weights, and measures, which your Memorialists view as a most important step in advancing the Arts, Manufactures, and Commerce of the country, to the promotion of which the efforts of your Memorialists are directed.

Your Memorialists consider that it is a question not only of national importance, but extends to the future mutual relations of all countries in the world, and they therefore beg leave to submit the following views, which have been advanced in this Society, as well worthy the attention of Her Majesty s Government.

The progress of science and commerce is gradually rendering different nations more and more necessary to one another, and the growing education and intelligence of the people are every day sweeping away the feelings of personal antipathy which formerly existed between nations at a time when very few years ever passed without their being engaged in hostilities.

The Exhibition of 1851 was a striking example of the extent of the sentiments of goodwill among different nations which that event called forth. The variety of the produce of their industry shown together in London must have proved to the most unthinking that the very differences of race, character, or genius which may exist among nations are only means appointed by Providence to render them dependent upon one another for supplying most of their outward wants.

That Exhibition having sprung from this Society, has induced many of its members to direct their attention to an improved system of international relations, and they would desire to use every opportunity of drawing attention to the numerous benefits which may yet accrue to the whole world, by facilitating personal and commercial intercourse between various nations.

It has been suggested that uniformity in coins, weights, and measures, would be of the greatest importance in this respect to commerce; and in the case of weights and measures, would at the same time greatly facilitate scientific research.

As, therefore, the Government must necessarily be engaged in researches as to the best means of accomplishing the change to a decimal system of coins, weights, and measures, it is respectfully submitted to them, that it may be of use to inquire whether, by arrangement with neighbouring nations, some steps may not be taken which may tend eventually to an adoption of an uniform system throughout the world.

It is very probable that such a measure will be sooner or later called for so loudly by different nations, as to force it upon the attention of their respective governments; and it is possible that the Government of this country might be forced into a second change not a great many years after that now contemplated. It is therefore well worth their consideration, whether the inconvenience of one of these changes might not be avoided by a little judicious foresight.

Even were such attempts found unsuccessful in the present state of the world, it is submitted that it would be a glorious act on the part of England making the first advances,—worthy of the nation which inaugurated unrestricted commerce, unrestricted navigation, and which invites by its Exhibitions, and by its policy, the most unrestricted competition, and therefore cooperation among the people of the whole world.

It is further submitted, that there is nothing impossible in realising such an idea. Several nations on the continent of Europe have already the same coinage, and the metrical system of weights and measures is still more widely adopted, and this with the greatest advantage and convenience to the inhabitants of the several countries.

It is not desired to press any particular standard upon the attention of the Government, who have all the intelligence of the country at their command; but it is considered that the views above expressed have not yet been brought forward with the prominence they deserve, and your Memorialists have therefore taken leave to submit them to your Lordships.

Signed for, and on behalf of, the Council of the Society of Arts,

Edward Solly,
*Secretary.*

*March* 23*rd*, 1853.

## SPECIAL PRIZE.

It is desired to call attention to the fact, that the Essays on the History and Management of Literary, Scientific, and Mechanics' Institutions, —and especially how far, and in what manner, they may be developed and combined, so as to promote the moral well-being and industry of the country,—for which the Council has offered two premiums, the Society's Medal and 50*l.* for the best, and 25*l.* for the second best,—must be delivered at the Society's House, on or before the 31st of March next.

It should be observed, that this restriction applies to all the subjects enumerated in the Society's Premium List, with the exception of articles of Colonial produce.

It should be known that the Society, in all cases, expressly reserves the power of rewarding each communication in proportion to its merit, or even of withholding the premium altogether. In every case, however, Candidates may be assured that their claims will be judged with the utmost liberality.

## FRENCH EXHIBITION OF ALL NATIONS.

The following decrees were made at the Palace of the Tuileries on the 8th inst.:

"Act 1. A Universal Exposition of Agricultural and Industrial Products will be opened at Paris, in the Palace of Industry, Square Marigny, on the 1st of May, 1855, and will be closed on the 30th of September following. The products of all nations will be admitted to that Exposition.

"Act. 2. The Quinquennial Exposition which, in terms of Act 5 of the Ordonnance of the 4th of October, 1833, ought to open on the 1st of May, 1854, will be united with the Universal Exposition.

"Act 3. A further decree will determine the conditions upon which the Universal Exposition will be made, the regulation under which the goods will be placed, and the different kinds of produce capable of being admitted."

## DUTIES ON PAPER, NEWS, ETC.

Mr. Milner Gibson has given notice of a motion for the 14th of April, relative to the duties on news, advertisements, and paper. Literary and Scientific Institutions, and Mechanics' Institutes desiring the repeal of these taxes, may, with advantage, avail themselves of this opportunity for conveying to the Legislature their sentiments on the subject. A form of Petition which has been adopted by some Institutions is annexed. One name at least should be on the same sheet as the words of the Petition itself.

FORM OF PETITION.

*To the Honourable the Commons of the United Kingdom of Great Britain and Ireland, in Parliament assembled.*

The humble Petition of the several persons whose names are hereunto subscribed,

Showeth,

That your petitioners are members of a society established at , under the title of , which has a library and reading-room that are much frequented.

That all taxes which impede the diffusion of knowledge are injurious to the best interests of the public.

That the tax upon newspapers, called the stamp, the excise duty upon paper, and the tax upon advertisements, are direct obstacles to the spread of all kinds of valuable information amongst the great body of the people.

Your petitioners therefore pray that the excise tax upon paper, the tax upon advertisements, and the stamp tax upon newspapers, may be abolished, leaving the proper authorities to fix a small charge for the transmission of newspapers by the post.

And your petitioners will ever pray.

The following letter on the same subject has been received by the Council:

Dublin Statistical Society, 40, Trinity College,
Dublin, 11th March, 1853.

Sir,—I am directed by the Council of the Dublin Statistical Society to acknowledge the receipt of your communication of the 8th instant, respecting the Duties on Paper, Advertisements, and News; and to state in reply, that the Statistical Society has no news-room, and consequently the Council have no replies to make to your special queries.

The Council, however, desire me to express their conviction of the injurious effects arising from the Duties on Paper and Advertisements, and their desire for the immediate and complete repeal of these taxes.

The tax on foreign books they consider still more objectionable; the amount of revenue produced by it is insignificant; it operates therefore as an artificial impediment, wantonly imposed on the dissemination of the productions of foreign writers and thinkers; thus impeding the progress of knowledge amongst mankind, and retarding the development and acquaintance with, and respect for, the thoughts and feelings of foreigners, which form the best securities for peace, and for uninterrupted advancement in civilization.

With respect to the effect of the Excise regulations on the development of the manufacture of paper, there is a point which has, no doubt, been brought under the notice of the Society of Arts; but which is so illustrative of the effects of Excise regulations on manufactures, that it is worth repeating.

The Council have been informed by a paper manufacturer, that the paper in the moist state in which it leaves the paper machine, is suited for being immediately used (without being cut or taken off the machine), for making room-paper, or for printing books; and that, were it not for the Excise regulations, these manufactures could in many cases be combined, so that the rags would be put in at one end of the machine, and room-paper, or the printed sheets of a book brought out at the other.

The Excise regulations, by prohibiting the manufactures from being combined, compel the paper to be cut, dried, examined for taxation, carried to another manufactory, and moistened and placed in a similar position to that in which it was before the interference.

W. Neilson Hancock, *Secretary.*

## COLONIAL POSTAGE.

Her Majesty's Postmaster-General having said, in reply to a Deputation from this Association, on the 4th March, that it was the intention of Government to reduce the rate of Postage on Colonial letters to *Sixpence* per half ounce; of which sum one Penny was stated as being intended to cover the expenses at home, one Penny those in the Colony, and *Fourpence* those of Ocean transit,

It was Resolved at a Meeting of the Council of the Postage Association, held on Tuesday, the 15th March, 1853,—

That this Association is gratified with the declaration of the Postmaster-General, as far as regards *uniformity* of Colonial Postage, but considers that the *rate* proposed does not meet the objects of the Association, which cannot relax its efforts to obtain a very much lower rate of charge than that proposed, and thus to secure for the Colonies and Dependencies the same advantages of intercommunication that have been obtained for the Mother-country.

The Association considers, that the proposed charge of Fourpence for the Ocean transit of letters, whether effected by vessels subsidised by Government or by private ships, is entirely inconsistent with the principles upon which the uniform rate of the Penny-postage was established; it having been satisfactorily proved that distance was not the element upon which the rate of postage should be computed.

That the proposed charge of Fourpence per half-ounce is at the enormous rate of *59l.* *14s.* *8d.* per cwt., or

1,194*l.* 13*s.* 4*d.* per ton, and can only be viewed as a serious tax on the intercourse between the Colonies and the Mother-country.

That the real cost of the freight upon a letter transmitted to our Colonies, even if estimated at the highest rate of freightage, is absolutely insignificant, and ought, when such important political, social, and moral objects are involved, to be disregarded, as it is in the case of Ireland, the Channel Islands and other places.

That the proposed charge would not put an end to the extensive evasions which are now practised.

That while the proposal of Government risks half the amount of the present gross revenue from Colonial letters, it does not hold out the same prospect of the loss being compensated by a large increase in the number of letters, as, judging from experience, might be relied upon, if a much lower rate were at once adopted.

That the proposed charge on Colonial letters is at variance with the suggestion made by Mr. Rowland Hill, in 1838, that the charge on Colonial and Foreign letters should be at the rate of 2*d.* the single letter.

The Association regrets that so high a rate should have been proposed for the British Colonies, at the moment when Government is negotiating with foreign countries for large mutual reductions of postage.

And, lastly, the Association believes, that had the experiment of Penny-postage at home been tried in a partial manner, such as is now proposed with regard to Colonial postage, it would have proved a failure instead of becoming, as it has, one of the most extraordinary blessings that was ever conferred by Government upon a country.

## PHOTOGRAPHY.

The following process, it is understood, has been adopted in France for keeping the collodion plates sensitive for many hours. Two pieces of plate glass, of equal size, are taken, and on one the collodion film is spread in the usual way; it is then dipped in the nitrate of silver bath, and when the streakiness has disappeared it is lifted vertically from the bath, leaving the lower edge just immersed in the fluid. The second piece of glass is then applied to the collodion film, beginning at the lower edge. A thin stratum of the solution, by capillary attraction, becomes enclosed between the two glasses, which are then placed in the slider; and it is said that thus prepared, they may be kept sensitive a whole day, before exposing them to the action of the camera. On the operator's return home, the glasses are easily separated by the introduction, at one corner, of a thin ivory or bone paper-knife, without any injury to the collodion film, and the image is then developed in the usual way. If any of the readers of the Journal should try this plan, it is very desirable that they should give the Society the benefit of their experience by sending an account of their success or failure.

## HOME CORRESPONDENCE.

### PHOTOGRAPHY.

Sir,—I see by the reply of Mr. Reveley, in your Sixteenth number, to my letter inserted in the Thirteenth, that, if I have not to deal with a practical photographer, I have opened an interesting discussion with a gentleman of great scientific abilities, well versed in questions referring to the principles of optics, whose opinions must be met with sound and serious reasoning, and who, from his temperate style, appears to have no other aim than progress in truth and science, and more particularly the improvement of the art of Photography. Such being the feeling, I am sure that he will like to know how far a practical photographer finds that his theories can be supported by experiment.

For this reason, and also for the benefit of those of your readers who are interested in these questions, I beg to be allowed to reply to Mr. Reveley's last letter.

It is perfectly understood that in Photography the rays operating are only those which are situated at the most refrangible part of the spectrum, from the blue rays to invisible rays extending beyond the violet rays, the greater action being between the lines G and H of the spectrum; that the red, orange, yellow, and green rays have no sensible photogenic action, except some curious influence which I have treated of in a paper published in the Philosophical Transactions of the Royal Society for 1847.

If the whole spectrum had a photogenic action, it would be more difficult to correct perfectly the chromatic aberration, not only on account of the great length of the dispersion, but also on account of the irregularity of that dispersion.

If we measure the whole spectrum we find that the rays which contribute to a visual image occupy about one-half of its length, and the chromatic aberration of these rays, according to Mr. Reveley's own observation, is sufficiently corrected by first-rate opticians. But I hope to prove that the aberration of the actinic rays constituting the other half of the spectrum may be corrected by the same means.

If, by the combination of two prisms of different dispersive powers, it is possible, by the angle given to both, to refract to the same point the red and green rays, it is also possible, by increasing the angle of the most dispersive medium, or reducing the angle of the less dispersive, to increase the amount of its chromatic correction, so that the violet ray may be brought to the same point as the red ray, and even beyond it. But such a proportion between the refractive angles might be an impediment to the correction of the spherical aberration, and fortunately it is not necessary to employ such a means. The correction of the dispersion of the most refrangible part of the spectrum, which only contributes to the formation of the photogenic image, can be effected with a smaller difference between the angles of the two glasses which is more favourable for the correction of the spherical aberration. Provided the violet ray is brought to the point where the blue ray is falling on the axis of the foci, this is all that is required for the production of a correct photogenic image; of course, there may be a certain aberration of the yellow, orange, and red rays, but this does not affect the photogenic image.

The same proportion between the angles of the two prisms may produce a sufficient correction for the aberration of the visual rays, but there will be on the visual focus a certain aberration of the blue, indigo, and violet rays, and of the actinic rays occupying the same part of the spectrum. This aberration of invisible rays, or at least, of rays contributing so little to the formation of the visual image, will not affect in a sensible degree the correctness of the visual image.

We may have, therefore, on two different planes, two correct images; on one plane a correct visual image, on another plane a correct photogenic image. In taking care to place the ground glass on the plane giving a correct visual image, and the photographic tablet on the plane giving a correct photogenic image, we have all that is required in photography from the use of a camera obscura.

I have indicated the means of easily finding the photogenic focus by comparing on the focimeter the difference between the visual and the photogenic focus; and photographers have no difficulty when the object-glasses have a photogenic focus not coinciding with the visual focus, which is always more or less the case in the best constructed glasses. But first-rate opticians have the power to render this difference very small for a certain distance of the camera from the object, and so small that the two foci may be said to coincide. I say for *one* distance, because it is impossible to have the two foci coinciding for all distances. But I have discovered that by some atmospheric influences the achromatism of object-glasses is constantly varying, so that for one distance the two foci may coincide in certain circumstances and differ in others.

This phenomenon I have constantly met with for more than ten years, and although the fact is received by some persons with incredulity, the more I experiment, the more proofs I have of its truth, which I trust will very soon receive some explanation from the late splendid discovery of Professor Stokes, placing beyond doubt the change of refrangibility of the various rays. In fact, when we consider that light is constantly varying in its constituent proportions, according to the vapours of the atmosphere,—that the density of the atmosphere is always undergoing changes,—how can we doubt that the refraction and dispersion of that medium does not always bear the same ratio with the refraction and dispersion of the glass, which has been the base of the calculation of the optician in establishing the curves of the glasses?

Mr. Reveley may be assured that there is no more difficulty in correcting the actinic aberration than in correcting the chromatic aberration, and the inspection of photographic pictures, such as I could show him, produced even by the whole aperture of lenses, will convince him that the problem has been solved. He must not judge from the pictures produced in the infancy of the art, or with bad instruments, which are more numerous than perfect ones.

At all events, the idea of employing deep blue glass for neutralizing the aberration of the luminous rays, cannot affect the aberration of the actinic rays. "*The copying of an engraving through a blue glass was a case perfectly in point*," for the object was to stop the red, orange, yellow, and green rays, and prevent their action on the tablet, and I mentioned this experiment as the most easy to perform. A long time ago I tried many other experiments, which I might have mentioned, being quite analogous, but not so simple, and for that reason unnecessary in a short reply.

One of these experiments, nearly the same as recommended by Mr. Reveley, I have just repeated before a friend, and has given the result I expected. It is as follows:

Having placed in the camera obscura against the frame receiving the plate a piece of blue glass covering only one half of the plate, I found on the photographic tablet, that the part of the image covered by the blue glass was considerably darker than the half not covered. But as it might be supposed that the glass itself had by reflection thrown away a certain amount of the actinic rays, I repeated the experiment, covering the other half with a piece of white glass of the same thickness, leaving between the two a sufficient space not covered at all by either piece of glass, in order to have at the same time the effect of the blue glass—of the white glass—and of no glass at all. The result was as conclusive as the first,—the part of the image covered with the white glass was apparently as light as the space not covered, and the part covered with the blue glass as dark as before. Therefore, the blue glass does more harm by its absorption of actinic rays than it does good by the absorption of neutralizing rays.

When I replied to the first suggestion of Mr. Reveley, it was not as a man who was actuated by any spirit of contradiction, but as one who from a conviction acquired by a long series of experiments, and who from the knowledge of his art has some ground to form a judgment, and to oppose those unfounded prejudices (which are so difficult to remove when they are so often repeated) against the most perfect and beautiful process by which man has ever been able to obtain the representation of all that can be seen, as true in shape and proportion as the images on our retinæ, and deficient only in colours.

Because people have seen, in the infancy of the art, and see even now from the productions of unskilful operators supplied with imperfect instruments, evident defects in Photographic pictures, they cannot imagine that these defects have been and are every day avoided. In fact, I may assure Mr. Reveley, and all those who share his prejudices, that Photography in its present state performed by experienced operators, and with such object-glasses as those which are manufactured by first-rate opticians, has attained the highest state of perfection which all lovers of the marvellous and beautiful could ever have imagined in their dreams of progress. The stereoscope has been the last and not the least addition to the wonders which art and science united could perform for the true representation of natural objects.

Mr. Reveley, in recommending the use of blue glass for lenses, imagines that by this means "views of buildings and of monuments of great architectural beauty might acquire the proper artistic gradation of middle tints, from the highest light to the deepest shade," and he adds, "that he cannot understand why excluding light rays, which confessedly do no good, but which might possibly do great harm, can be any disadvantage." But I can assure him on this point that blue glass is a decided disadvantage; it is, indeed, the medium known which allows the actinic rays to pass in the greatest quantity, but it does not increase them when they do not exist,—and even the blue glass absorbs a certain amount of actinic rays. We have not yet discovered a really actinic medium through which the whole of the actinic rays are only admitted to the entire exclusion of all the other rays; if we ever discover it (and it might be the result of Professor Stokes' new investigation), we shall try it, and probably find some advantage in its use, for, from my own experiments, I have the conviction that a medium which would absorb none of the actinic rays, as does the blue glass, but would exclude the red, orange, and yellow rays, which are antagonistic to the actinic action, would be a great discovery in the art of Photography.

Is Mr. Reveley aware that, at the commencement of Photography, we operated in blue glass-rooms; and that we have been obliged, in order to operate quicker, to replace the blue by white glass?

I cannot conclude without speaking in the most impressive manner regarding the last suggestion of Mr. Reveley, when that suggestion, which in practice would be no advantage on account of the loss of light, which would be the consequence of magnifying the picture, leads him to state that "the features nearer the Camera are represented larger in proportion to those more distant; and that unless some change be made, Photography will never become, in common phrase, pleasing likenesses."

This is a most decided error, and a most unfounded reproach against Photography. There is no change to be made in Photography in this respect; the remedy to the imagined evil is known and very simple, and it is that which all good operators have the means to employ; viz., to take their portraits with a camera obscura, which has a sufficiently long focus to enable the operator to place the apparatus at such a distance from the person, that the perspective on the Photographic picture will be equal to the perspective that a good portrait-painter will give to the various parts of his subject, and which he must give in order to be correct; in other words, equal to the perspective we have on our retinæ. Surely it is not necessary or desirable to represent objects with less perspective than that with which we see them naturally?

I must not omit the suggestion of "constructing a camera, of such a size that a photographer could place himself inside with stool and shelf, upon which he might perform the whole of the manipulations." But what manipulation Mr. Reveley does not say,—and I do not see any which can be performed while the light is operating. In the Daguerreotype process it is not necessary to prepare the plate on the iodine or bromine in the camera obscura; and the effect of mercury would not be a very wholesome one for an operator placed in his camera obscura. These operations can be made with more advantage, and better, in separate apartments. In the Talbotype some operations may be advantageously performed immediately, particularly in the collodion process; and I understand that Mr. Archer has contrived a camera with which he can perform on the spot all the necessary operations, without enclosing himself in the apparatus; and where the tablet must be placed at eight, ten, or fifteen inches from the object-glass the space is rather contracted for a good-sized operator.

I have not the honour of knowing Mr. Reveley personally, but having had the advantage of discussing with him some points of my profession for the sake of truth and science, this circumstance I hope may induce him to favour me with a visit at my establishment, where I shall be most happy to remove all his doubts respecting the deficiencies of the art of Photography.

I am, Sir, your obedient Servant,
A. Claudet.

107, Regent-street,
17th March, 1853.

## MEASUREMENT FOR TONNAGE.

Sir,—I most cordially agree with the sentiment expressed in the letter of your Correspondent, H. M., inserted in your Journal (No. xvi., page 190,) "that this subject should not be hastily dropped." But I must beg to differ from H. M. as to the mode of carrying out any improved measure. It is not by abstruse or intricate calculations that the capacity of a vessel should be ascertained; they are at best approximations only to the truth, and are not at all suited to that class of persons whose duty it is to measure for legal tonnage. Besides, in order to ensure something like accuracy, the formula must vary with every description of build; for it would be absurd to suppose that a heavy merchantman could be measured by the same formula as a clipper yacht or a crack steamer.

It is not the internal capacity of the hull that is required; it is the actual weight necessary to sink it from light to load-water line, or its equivalent, the weight of sea water displaced by that portion of the hull comprised between the two water lines. Now the specific gravity of sea water being known, if we could ascertain the exact cubical contents (outside measure) of the hull, the true tonnage would also be known; and herein consists the great difficulty, because the curves upon which the hull is formed are not mathematical lines, but arcs of circles, variously united by means of elastic rulers, and are not therefore reducible to any form of algebraical equation.

It is to the ship-builder that we must apply, who, having every dimension accurately laid down on paper to scale, and in the loft real size, could be required by an Act of Parliament to furnish a legal document under his hand, to be attached to, or embodied in the ship's register, expressing the exact cubical contents of all that portion of the hull which is wet with water between the two water lines.

It would, however, be a much simpler plan to obtain the real weight from the Customs department, which always knows to a pound what a vessel carries; due regard being had to the proper position of the two water lines, and the difference between the specific gravity of salt and fresh water, as the case may be.

There may possibly be other means of obtaining the facts of the case with strict accuracy; all I contend for is common honesty, and that when a vessel shall be sunk to her proper load-water line, she shall be known by her register to have so many tons and fractions of a ton on board. The present regulations most absurdly give tenths and hundredths of a ton, when a vessel may be able to carry double her register tonnage, or none at all.

I have often heard the observation made, that it is impossible to ascertain the true tonnage, by reason of the very different nature of the cargo a ship may carry. So far it may be said to be true, that if she were loaded with lead, or quicksilver alone without dunnage, she could not carry her full weight, because her masts would soon go by the board. Neither could she carry her full weight of wool alone, though stowed with screwjacks, for want of room for so light a material. All this, however, is the business of the merchant and shipowner, not of the Government,—which, when it descends to contemptible details between man and man, or buyer and seller, opens the door to every species of fraud, peculation, and immorality. The *ad valorem* duty on foreign silk, for example, excites an interest in the agent to underswear, and the Customs officer to overswear the value of the goods; and then, perhaps, after a lengthened dispute, during which the turn of the market may be lost, the two may agree to go shares in a sham seizure and forced sale, whereby the revenue, the merchant, and persons even remotely connected with the transaction may be, and are frequently defrauded to an enormous extent.

Indeed, the Government, while it continues to levy duties and taxes by means of oaths instead of by measure, weight, and number, may be said to be the great aider and abetter of the crime of perjury throughout the length and the breadth of the land.

Why should not silk or anything else pay so much duty per ton, good, bad, or indifferent, and let the shippers and consignees settle the matter of quality among themselves?

The universal application of this principle of discriminating denominations, and disregarding quality in the Customs department, would prevent in a great measure the flooding of our markets with low-priced foreign goods, and would in some degree be a protection to our own native industry.

Henry W. Reveley.

Parkstone, March 19th, 1853.

## DECIMAL CURRENCY.

City, 22nd March, 1853.

SIR,—In making the change from our present system of notation to the decimal, I think it is of the utmost importance that we should strictly preserve the decimal, and not intermix the centesimal with it. To introduce two modes of progression would tend to complicate the matter without giving any compensating advantage. In effecting the change, I think it is most desirable that the names of familiar coins should be retained as much as possible, and that it would be less inconvenient to the mass of the people to have the coins which are most used by them, slightly altered in value, than to have new coins and new names circulating with old ones. By making the Pound contain 1,000 of the present Farthings the decimal system would be accomplished. All mercantile establishments would instantly alter their systems of book-keeping to a Pound, and its decimals, without waiting for any new coinage. The silver divisions of a Pound would of course represent their proportion of Farthings:—the Florin 100 Farthings; the Shilling 50 Farthings; the silver Sixpence 25 Farthings. But I would still have only 4 Farthings in the Penny, and 2 in the Halfpenny as usual—although, of course, their relative value to the Pound also would be slightly altered; namely, there would be 250 pence in a Pound, 25 in a Florin, 12½ in a Shilling, &c., the alteration being only four per cent. on the coppers, which could affect no one injuriously, and not at all for more than the first day of the change. Let us suppose a person getting 8*s*. 9*d*. per week—for it is the poor I feel interested about—the rich and informed can take care of themselves; and on the Saturday he receives his 8*s*. 9*d*., on which day the change has taken place—he receives 8*s*. 6*d*. in silver and the 3*d*. in copper. On changing his silver 6*d*. he gets six Pennies and one Farthing, so he is no worse off; but the small dealer, the chandlers' shopkeeper, how does he manage? He would find when he sold articles for coppers that it would be necessary to increase the nominal price a little, namely, four per cent., to enable him to realize as much as he did before.

Of course it would be desirable that we should have coins representing 10 Farthings, otherwise the poor would not so readily avail themselves of the decimal system; but still the change for all business purposes could be effected without new coins. I do not know if an Act of Parliament would be required to alter the relative values of the copper coins or tokens to the Pound; if so, or not so, I trust the present Government will not allow this year to pass without inaugurating a system demanded by all persons engaged in mercantile pursuits. Yours, &c.,

DECIMAL.

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March 16th, 1853.

SIR,—As a prospective Decimal Currency is engaging the public attention, will you permit me to follow up the valuable remarks which have appeared in the JOURNAL OF THE SOCIETY OF ARTS, with a few practical suggestions?

The objects proposed are, to reduce our present system of computation to a more simple form, interfering in the least possible degree with long-established usages, and the accustomed operations of mental arithmetic; to retain, as far as may be practicable, familiar names, and to render service to the science of foreign exchanges.

The first question which presents itself is this: Shall the Pound or the Florin be the unit of value? The reply seems instinctively to be, the Pound: an attempt to reduce the integer would offer too rude a shock to public opinion. From this idea, two propositions have resulted; the first, to retain the present form in our books of account, substituting Florins for Shillings, and Cents for Pence and Farthings—thus, £1 9f. 99c.=1*l*. 19*s*. 11¾*d*.; the second, to introduce four terms, or designations—the Pound, Decines, Centines, and Millines, the last arising from the necessity for a coin of smaller denomination than the Centine of a Pound, which is equivalent to 2⅖*d*. But, regarding the subject practically, it does appear that our system offers a singular facility for the adoption of a more simple method. Imagine the line of separation between the Pound and the Florin evanescent, and the difficulty vanishes; precisely the same figures occupy precisely the same position, 19 Florins=1*l*. 9 florins. No mental process is required; it is intuitively perceived that, although the Florin is the unit, each figure in excess will represent Pounds, and the statement of value will assume the simple form 19,99.

Another question immediately arises—How will the change affect the transactions of daily life in their minuter forms?—How shall the transition be regulated and explained, so as to present no formidable obstacle to the least susceptible mind? The sum of 1*l*. 19*s*. 11¾*d*. is to be represented by 19,99. The first part of the process is sufficiently obvious:—Divide the number of shillings by 2, the quotient will represent Florins—thus: 18÷2=9; therefore, 1*l*. 18*s*.=19 Florins. The chief difficulty therefore ranges within the limits of the Florin and the Centine. To aid in the solution of the problem, the accompanying Table* has been prepared in which every fractional value is indicated; thus provided, the operation of the new system may be traced. The price of some article of merchandise is demanded; the reply may be 11 Cents, or 35 Cents. This answer at first may convey no definite idea of its value, and the mind at once reverts to the former method of computation as a standard. How is the desired result to be attained?—a very simple mental process will suffice for the purpose. 100 Centines being equivalent to 96 Farthings, the number of Cents in small amounts divided by 4 will indicate the exact value in Pence and Farthings, and as the amount increases there will be a gradually increasing difference in the proportion 100 : 96 or 25 : 24—thus, Cents, 11÷4=2¾; whereas, in 35 Cents similarly divided, the Table indicates a slight difference. However, the respective values of the Sixpence, the Shilling, and combination of both—namely 25, 50, 75, the recognition of which would soon become natural—would prove cardinal points in assisting and correcting the calculation.

To return, then, to the original number, 99:

99÷4=24.75.
100 : 96 : : 24·75 : 23¾=1*s*. 11¾*d*.
Thus: 1*l*. 18*s*.=19 Florins,
1*s*. 11¾*d*.=,99 Centines.
£1 19*s*. 11¾*d*.=19,99.

The next subject for consideration is the value and the designation of the smaller coins; and with reference to this point, the proposition of Professor Jack seems to be especially valuable. For the convenience of exchange, it is expedient that each integer and decimal should be represented in the current coin. If this be granted, an appropriate designation must be sought; and is not the designation for a new coin suggested by the decimal division which marks the ten-cent piece as the true denarius? which, in the term penny, has found in our language a form of expression, and which may with peculiar propriety be adopted, although the coin to which it is attached may be altered in value; the penny at present in circulation being associated in our ideas with the quadruple of a farthing to be termed a four-cent piece. Should this idea be approved, it may perhaps be advisable to introduce at the first some distinguishing word, as the new or silver penny; custom would soon apply it correctly.

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* In this Table is given the number of farthings and cents—exact and approximate—in the scale from one farthing upwards to a florin, increasing by farthings, but it is considered unnecessary to publish it.

The penny (denarius), if issued as a substitute for the fourpenny and threepenny pieces, would remove a great perplexity in commercial transactions.

It would also suggest a significant term by which to designate the sixpence,—a name no longer appropriate, being equal in value with 25 cents., or 2½ of the new coin,—it may be termed a sestertius, or sesterce, the similarity in sound facilitating the adoption of the term.

With the addition of a coin of 5 centines, the system would stand thus:

Sovereign . . . . . = 1,000 Cents
Half-sovereign . . . . = 500 „
Five-shilling Piece . . . = 250 „
Half-crown . . . . . = 125 „
Florin . . . . . . . = 100 „
Shilling . . . . . . . = 50 „
Sesterce . . . . . . . = 25 „
Penny . . . . . . . = 10 „
Five-cent Piece . . . . = 5 „
Four „ . . . . = 4 „
Two „ . . . . = 2 „
Cent . . . . . . . = 1 Cent

Having been for several years connected with the commercial world, I trust that it will not be thought that I am venturing beyond the limits of my legitimate sphere in submitting these remarks for consideration.

I am, Sir,
Yours very truly,
H.

### VENTILATION OF WORKSHOPS.

SIR,—I am rather surprised that the simple process of downward ventilation has not been applied to remove the poisonous exhalations in the dipping and drying workshops of the lucifer match manufactories. The expense to the large manufacturers would be trifling, if even anything, considering that wages would be certainly less for a healthy employment than for an injurious one, let alone the consideration of suffering humanity.

The mode of application would be to lay down a second floor over the first, leaving a clear space of about eight or ten inches, the original floor being made as air-tight as it conveniently could. The false floor, if of wood, should be made of grating, similar to the gratings on board ship; if of metal, perforated plate; and if of brick, of the perforated malt kiln floor tiles. The work tables or counters should also be of grating, with loose boards, and barely large enough for the work to be done upon them.

In order to induce the downward current in the atmosphere of the workshops, two methods may be followed. The simplest, perhaps, would be to set up a furnace and high chimney shaft at some distance from the building, with a culvert connecting the space between the two floors with the ashpit of the furnace. Another convenient mode, where a steam-engine is employed, would be to cause it to drive any kind of blowing-machine, as a blowing-fan, &c., that would act in the reverse way as an exhauster.

The introduction of fresh air must of course be from the ceiling; but in order to prevent the unpleasant effects of a downward draft upon the heads of the work-people, a false ceiling of light frames covered with strained calico, should be suspended about five or six inches below the ordinary ceiling, and which should not reach the four walls of the room by three or four inches. Should the air introduced require to be warmed, a hot steam or water-pipe placed all round the room, close under the aperture, would effect that end.

I make this suggestion, because there appears to be a disinclination on the part of the manufacturers to introduce the amorphous phosphorus, which again when used on a large scale, might possibly cause some other unforeseen disease. The system of downward ventilation is the only means of rendering the atmosphere of dirty workshops and crowded assemblies sweet and wholesome. The adoption of the contrary, or the upward current of warm or cool air, has been the secret cause of the failure of Dr. Reid to warm or ventilate the House of Commons, to the satisfaction of any one Member of the House. The passage of air through the perforated floor of a room, must inevitably carry with it all the dust, dirt, and effluvia from boots and shoes, and in workshops from uncleanly vestments, vocations, and personal habits, right up to the faces and nostrils of the persons assembled therein.

HENRY W. REVELEY.

Parkstone, March 22, 1853.

## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ROYAL SCOTTISH SOCIETY OF ARTS.—At a meeting of this Society, held in their Hall, 51, George-street, on Monday, 28th February, 1853, David Stevenson, Esq., F.R.S.E., President, in the chair, the following communications were made:—1. On the Initial Velocity of Shot,—Range at different Velocities,—Eccentric Shot. By George Lees, LL.D. Dr. LEES, after giving a short exposition of the parabolic theory of gunnery, proceeded to give on account of Mr. Benjamin Robin's experiments on the initial velocities of balls, by means of the ballistic pendulum. He then compared the actual range at different velocities, and showed how little was gained in range by a great increase of velocity. He then referred to eccentric shot, observing that the range had been increased by this means to the extent of from 500 to 600 yards; and remarked that these effects were so very striking, as to be well worthy of the attention of the artillerist. There was no doubt that artillery was our right arm, and everything tending to improve it was eminently worthy of attention. 2. Description of a new process of Stereotype Moulds; with notices of the history and results of the process of Stereotyping. By Daniel Wilson, LL.D., F.S.A. Scot., V.P. Dr. DANIEL WILSON, in exhibiting this new method, stated that it was calculated to facilitate the process, and to introduce it into more general use, by diminishing the cost. In introducing the subject, he reverted to the curious fact —by no means singular in the progress of inventions— that, in the economic adaptation of printing to its fullest extent by means of stereotype plates, we are returning to a state of things nearly similar to the "Block Books," as they are called, which, in the beginning of the fifteenth century, preceded the great discovery of moveable types, and by means of which the first essays in printing were made by Guttenburg, Faust, and Mentz. The discovery of stereotyping, or the process of taking casts from forms of moveable types, was made by William Ged, a goldsmith of Edinburgh, about the year

1725; though imperfect attempts had been previously made to attain the same important end by Van der Mey, of Leyden, by soldering together the forms of ordinary moveable types for a quarto Bible, so early as 1711. He then detailed the various efforts at further improvement on this process, including those of Brunel, Allan, Sinclair, &c.; after which he described and exhibited the new process introduced by him to the notice of the Society, which consists in taking the casts of the types, not in gypsum or stucco, but in blotting-paper, overlaid with a thin layer of whiting, starch, and flour-paste, covered with a sheet of tissue-paper, and impressed on the types by means of beating it with a fine brush. It is then dried on a hot steam-chest, while still adhering to the types; and by this means a matrix is produced, and the types are again ready for distribution to the compositors within one hour. The advantages of the new process are—1st, The greater certainty of the process; the new matrix not being liable to warp or break, as the stucco is. 2nd, The greater rapidity; the process being completed in one hour by it, which could not be done in less than six by the other. 3rd, The practicability of using the matrix in certain cases for casting several plates, whereas the stucco mould is always destroyed in a single casting. And 4th, The much greater simplicity of the apparatus required, which added to the economy of time, and the consequent diminution of the quantity of type required for the compositors, give the important economic results which form the great merit of the new plan.

Mr. Dixon Vallance, Greenshields, exhibited in action a working model of his Condensed Water-pressure Wheel, by which he endeavoured to show its superiority to the Overshot Water-wheel, the water being applied to it in both ways.

* * *

INSTITUTION OF CIVIL ENGINEERS, March 1, 1853.—J. M. Rendel, Esq., President, in the Chair. The paper read was "On the Increased Strength of Cast-Iron, produced by the use of Improved Coke;" by Mr. W. Fairbairn, M. Inst. C.E. The paper commenced with a communication from Mr. Crace Calvert, on the subject of an improved system of depriving the fuel, whether used in blast furnaces or in remelting cupolas, of the deleterious substances by which the quality of the iron was deteriorated; or of the adaptation of the system to blast furnaces, when using coal for smelting iron ores. The object was chiefly to point out, what were believed to be, the causes of the inferiority of iron, in many works, apart from the varying qualities of the ores. These were stated to be the introduction and application of the hot blast, which had enabled the iron-master to reduce into cast and malleable iron a very large per centage of cinders, slag, and other impurities, containing large proportions of silicate of iron, sulphur, and phosphorus, all of which tended to destroy the tenacity of the metal, and to render it either "red short" or "cold short;" and also, when sufficient attention was not devoted, by those who were entrusted with the regulation and charging of the blast furnaces, to the chemical composition of the ironstone, by which the relative proportions of the flux and fuel employed in its reduction, should be regulated; the chemical composition of the limestone, or the coal not being sufficiently known; these materials often varying in quality as much as the ironstone itself; and the iron smelter was unable to tell, with certainty, the quality of iron which his furnace would produce. Instances had occurred where a siliceous ore had been used for three or four hours successively, and then at once it had been replaced by an aluminous and sometimes by a calcareous ironstone, without the change being made in the proportions of limestone or coal, which was evidently required by the different qualities of those ores. The injurious action which an impure fuel had upon the quality of the iron was particularly alluded to; and the necessity of removing the sulphur from the coal or coke, when employed in the blast furnaces, before it could be imparted to the cast-iron during the process of smelting, was strongly enforced. Mr. Crace Calvert had introduced the following simple process. If the blast furnace was worked entirely with coal, chloride of sodium was added with each charge in proportion to the quality of the ore and flux employed; but a better result was produced if the coal was previously converted into coke, and an excess of the chloride was used in its preparation in order to act on the sulphur of the coal and of the ore, should any be found therein; and a greater improvement was manifested in the quality of the iron when only coke so prepared was used in the blast furnace. The coke so purified emitted no sulphurous fumes when taken out of the coke oven, nor when extinguished with water did it give off the unpleasant odour of sulphuretted hydrogen; nor was there any sulphurous acid gas liberated during the operation of smelting iron in the cupola, or in raising steam in the locomotive boiler by coke so prepared; and it was stated that these decided advantages were gained in some cases at an additional cost of only one penny per ton of fuel.

The second part of the Paper gave the results of a series of experiments which had been made by Mr. Fairbairn, upon trial bars one inch square, cast from iron melted in the cupola, with coke prepared by the process of Mr. Crace Calvert. Specimens were exhibited of the iron so prepared, when the closeness of texture and the absence of the "honey-comb" appearance prevailing in the iron cast with the ordinary coke was clearly demonstrated. The mode of experimenting was described, and the results were given very elaborately, and it was shown that the average increase of strength was from ten to twenty per cent. Taking the mean of the whole experiments the following conclusions were arrived at:

| | lbs. |
|---|---|
| The mean breaking weight of the bars per square inch melted with the improved coke, was | 515·5 |
| Ditto ditto with ordinary coke . | 427·0 |
| | = 88·5 |

in favour of the castings produced from the improved coke, or in the ratio of 5 to 4. The experiments on the bars smelted with the improved coke indicated iron of a high order as to strength, and might be considered equal to the strongest cold blast iron; the metal appeared to have run exceedingly close, and exhibited a compact granulated structure, with a light gray colour.

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ROYAL GEOGRAPHICAL SOCIETY, March 14.—The President, Sir Roderick I. Murchison, in the chair. The paper read was "On the Great Isthmus of Central America," by Captain Robert Fitz-Roy, R.N., F.R.S., F.R.G.S.; illustrated by Mr. Arrowsmith and others. After some introductory and general remarks, Captain Fitz-Roy took a brief view of seven lines of proposed inter-oceanic communication. He then mentioned the novel and important information recently received from Mr. Gisborne and Dr. Cullen, and he showed that whatever preference might have been given formerly, in 1850, to the Atrato and Cupica line for a shorter communication, there is no argument that can be adduced in favour of that line that does not apply with far greater effect to the line proposed between the Gulf of San Miguel and the almost classical locality formerly named by Paterson (who founded the Scotch colony on the Isthmus and the Bank of England) Caledonian Harbour. Captain Fitz-Roy then examined the geographical details of that part of the Isthmus, gave a sketch of the present state of our knowledge of the vicinity, and a brief outline of its history. He then entered into considerations of the nature and feasibility of a canal of such a gigantic scale as is contemplated by Sir Charles Fox, Messrs. Henderson, Brassy, Cullen, and Gisborne. He alluded to the labour attainable, to the possibility of employing convicts, and to the prudence of establishing military organisation to a certain extent, for the sake of order, and, possibly, defensive measures. He then referred to the two great impediments to such an undertaking, the native aborigines and the climate; and he showed by what means those obstacles might be greatly lessened. Mr. Gisborne's opinions of the size and nature of such a canal were detailed, and Captain Fitz-Roy advanced others, somewhat at variance with them. The claims of other Companies, to certain legal doubts that should be solved were referred to, and also the general character and objects of an enterprise so important that (when a survey shall have fully proved the whole case) Government will doubtless assist the undertaking, and all maritime nations will eagerly unite in guaranteeing its absolute neutrality.

## PROCEEDINGS OF INSTITUTIONS.

Bakewell.—A Lecture on the subject of "Italy" was delivered before the members of the Bakewell and High Peak Institute, on Tuesday evening last, by the Rev. J. B. Jebb, of Walton Lodge, near Chesterfield. The lecture was the result of personal observations during a tour made in that country a year or two ago, and was replete with anecdote; while in historical, political, and religious points of view, it was well worthy of the attention which it received. The illustrations of scenery and costume were exceedingly good, while the maps and charts enabled the audience to transport themselves at once to the particular localities described.

Barnet.—On the 23rd of February last, a concert of sacred music was given in the Town Hall, on behalf of the Building Fund of the Barnet Institute; the principal singers being Mrs. J. Roe, Mrs. W. Dixon, and Messrs. J. and G. Brooks. The programme was selected from the works of Handel, Mozart, Mendelssohn, &c.

Brighton.—A Lecture on the "Electric Telegraph" was delivered to the members of the Mechanics' Institution, at the Town Hall, by Mr. John Banks, Secretary to the Hastings Mechanics' Institution. The lecturer commenced by giving a brief description of telegraphic communications, including the ancient beacon, referred to in the *Agamemnon* of Æschylus, the pitch-pot beacon of the ancient Britons, and that of the Saxons, Chappe's, and the shutter telegraphs, the Admiralty semaphore and ship signals. He next alluded to the electric telegraph, giving a description of the method of working it, in which he was assisted by several well-executed diagrams and experiments. A vote of thanks was unanimously awarded to the lecturer. The Second Annual Soirée of the Mechanics' Institution took place at the Assembly-rooms, in the Town Hall, on Monday evening, February 28th. At half-past eight o'clock the chair was taken by J. C. Burrows, Esq., Vice-president. The Chairman stated, that the Society was in a flourishing condition, comprising at present 355 members, and that the classes were well attended; that the library contained 1,800 volumes, which circulated among the members to a very large extent He also referred to the benefits that had accrued to the Institution through the union effected with the Society of Arts, and stated that the reading-rooms had been well attended during the past year. Subsequently, P. O'Brien, Esq., delivered an address upon "the Objects of Mechanics' Institutions." H. Stein Turrell, Esq., and Major Fawcett, afterwards addressed the meeting, which was numerously attended, there being upwards of 800 persons present.

Bury.—The first of a short course of four Lectures on different subjects, by various gentlemen in the town, was recently delivered to the members and friends of the Athenæum, by the Rev. E. J. Hornby, rector, on the "Early History of England." The Rev. Lecturer commenced by giving an account of that portion of our history immediately preceding the invasion of the Romans, and then went on to notice the different races of people who made incursions into this country. He gave a general account of the various rulers of the kingdom down to the death of Harold, noticing in his course the first introduction of Christianity into Britain. The Second Lecture of the Course was delivered on Thursday evening last, by Mr. B. Glover, "On the Pursuit of Knowledge, its Duties, and Advantages;" in which the lecturer earnestly advocated the study of biography, as a means of creating emulation in the minds of his hearers, and instancing remarkable examples of men who have raised themselves by means of their own exertions and perseverance in the objects of their pursuits.

Cheltenham.—The Annual Meeting of the members of the Literary and Philosophical Institution was held on Tuesday the 8th instant, the President, W. M. Tartt, Esq., in the chair. In reference to their Union with the Society of Arts, the Report stated that in return for the subscription several works of value and interest had been received; and the chief object of this connection—the obtaining first-class lecturers at a moderate amount of remuneration—would, it was hoped, be made available during the ensuing session. A league, or union, with others societies of a like nature to their own, in the neighbouring districts, had been found impracticable; and it was to be regretted that this had been attributable, in several instances, to difficulties occasioned by diminished support. Under these circumstances it was gratifying to know that the Cheltenham Institution still maintained a position of usefulness and activity. Its financial condition was improving, the amount in arrear being only 29*l*. 2*s*. 10*d*., while this time last year it was 46*l*. 7*s*. 5*d*. Thanks for his past services were voted to the President; who, in resigning his office, expressed his regret that he was no longer able to devote to it the time and attention which he felt that it both required and deserved. The Rev. Morton Brown, LL.D., was appointed as his successor. E. R. Humphreys, LL.D. (Head Master of the Cheltenham Grammar-school), as one of the Vice-presidents; and the Rev. H. W. Bellairs, District Government Inspector of Schools, as one of the Council.

Crewkerne.—On Thursday, March 3rd, the Fourth Anniversary of the Literary and Scientific Institution was held in the Town Hall; the Rev. Dr. Penny in the chair. The Report stated that during the past year upwards of 800 volumes had been circulated; the lectures were well attended, and the number of members had increased. The financial statement showed a balance of 4*l*. in favour of the Institution. Mr. Sparks, the Rev. J. Polehampton, Mr. Pendered, and other gentlemen addressed the meeting, recommending among other things the formation of classes, which it is hoped will shortly be carried into effect. The following gentlemen were elected to serve on the Committee: Messrs. W. Sparks, G. S. Jolliffe, F. Wills, G. Pulman, J. Pendered, J. Wheadon, Rev. J. M'Dowall, S. Heowe, and J. Light; Treasurer, Mr. W. Y. Standfield; Honorary Secretary, Mr. J. Pearce; Librarian, Mr. S. Turner.

DAWLISH.—The Third Annual Report of the Literary and General Knowledge Society, states that the number of members is 119, of which 9 are honorary. During the year, 105 books have been added to the library, which now comprises 610 volumes. The financial statement shows an expenditure of 45*l.* 3*s.* 10*d.* against 55*l.* 2*s.* 1*d.*; leaving 9*l.* 18*s.* 3*d.* in the hands of the Treasurer.

PLYMOUTH.—On Wednesday last Mrs. C. L. Balfour, of London, delivered an interesting Lecture to the members of the Mechanics' Institute, on the "Female Characters of Shakspere." Her exemplifications of character and illustrative quotations were listened to with great gratification by a large and attentive audience. On Friday evening, Mr. C. F. Barnard, of Plymouth, gave a Lecture on the "Adulterations of Food." The subject was treated with great skill, and the illustrations and chemical tests described in a masterly manner.

ROYSTON.—On Tuesday and Wednesday evenings, the 1st and 2nd instant, two Lectures on "Arctic Expeditions," especially those sent in search of Sir John Franklin, were delivered before the members of the Mechanics' Institute, by C. R. Weld, Esq., Assistant-secretary of the Royal Society. The lecturer gave an interesting sketch of early arctic maritime enterprise, relating the discoveries of Cortereal, Gomez, Cabot, Thorne, Willoughby, Frobisher, Cook, Parry, Franklin, Back, and Ross. He then spoke of the equipment of Sir John Franklin's expedition, concerning which so much anxiety is felt by thousands in all parts of the civilised world. He gave many particulars of the various expeditions sent in search of Franklin by England and America—related the last information received of Sir Edward Belcher's expedition, and concluded by delivering his opinion on the prospects of the search.

SOUTHAMPTON.—On Wednesday evening the Rev. G. Waterman, from the United States, delivered a Lecture to the members and friends of the Polytechnic Institution, "on America; its People, Institutions, Government, and Laws, especially in reference to Negro Slavery." The lecturer, after referring to the different classes by whom the various sections of the Union had been originally settled, stated that even at the present time the distinctive characteristics of the primitive founders of the various states were still to be traced in their descendants, and that consequently the social and political institutions of the various states differed materially from each other. In considering the question of slavery, which he condemned in the strongest possible terms, he showed the difficulty of dealing with it, in consequence of its being one over which the Federal Government had no control, except in the territories and in the district of Columbia; the power to deal with it being reserved to the state governments.

WANDSWORTH.—On Tuesday, the 8th and 15th inst., two Lectures were delivered to the members of the Literary and Scientific Institution, by Mr. Deane F. Walker, on the "Original Eidouranion, or Large Transparent Orrery." The lectures were well attended, and were illustrated by an apparatus constructed by his father, Mr. Adam Walker.

YARMOUTH.—The Committee of the Young Mens' Institution are busily engaged with the necessary preliminaries for holding a conversazione on the 31st of March. The projected entertainment, besides comprising exhibitions of art, &c., will consist of musical performances, vocal and instrumental, short scientific lectures, readings, &c.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

### QUESTIONS FROM CORRESPONDENTS.

*Press for the Blind.*—Can any of your readers furnish me with the present address of Mr. W. Hughes, the inventor of the Press for the Blind, for which a Prize Medal was awarded at the Great Exhibition? T. P. [No. 50.]

*Writing Ink.*—What are the objections to the use of essential oils, which it is said prevent fluids becoming mouldy, in the production of black writing inks? [No. 51.]

### ANSWERS TO CORRESPONDENTS.

*Birdlime.*—In answer to your correspondent (No. 45), the following is the process adopted in the preparation of artificial birdlime:—The inner bark of the holly, gathered in June or July, is boiled in water for six or eight hours; the water is then drained off, and it is placed in a pit underground in layers with fern, and surrounded by stones; it is then left to ferment for two or three weeks, until it forms a sort of mucilage, which is pounded in a mortar into a mass; it is now to be rubbed between the hands in a stream of water until all the refuse is worked out; it is then placed in an earthen vessel, and left for four or five days to ferment and purify itself.

Should any of it adhere to the hands, it may be removed by means of a little oil of lemon bottoms or turpentine. I should also state that there is a natural birdlime which exudes spontaneously from certain plants; its colour is greenish, its flavour sour, and it is gluey, shining, and tenacious. The natural is more adhesive than the artificial birdlime. I am not aware of any extensive manufactory of birdlime in England.—C. BEARD.

*The Smoke Nuisance.*—Your Correspondent (No. 49) seems to be in error with reference to the Smoke Nuisance. A clause (No. 112) was introduced into the City of London Sewers Act, 11 Vict. 1847 and 1848, and one in a similar Act, 14 and 15 Vict. 1851, by which it is enacted, "That from and after the first day of January 1852, every furnace employed or to be employed in the working of engines by steam, and every furnace employed or to be employed in any mill, factory, printing-house, brew-house, bake-house, &c. . . . . or other buildings used for the purpose of trade or manufacture *within the City*, although a steam-engine be not used or employed therein, shall in all cases be constructed or altered so as to consume the smoke arising from such furnace, and if any person shall after the first January 1852, use any such furnace, which shall not be constructed so as to consume or burn its own smoke, without using to the satisfaction of the Commissioners the best practicable means for preventing or counteracting such annoyance, every person so offending shall forfeit and pay a sum of not more than *5l.* nor less than 40*s.* for, and in respect of every day during which or any part of which such furnace or annoyance shall be so used or continued." These Acts are not general, having been introduced by the City Corporation, who could only as a body ask for an Act to apply within their own jurisdiction. As a curious circumstance connected with this subject, I may mention, that while Messrs. Calvert, brewers, being in the city, are required to use means that the smoke of their furnaces shall be consumed, within a few yards on the Thames, innumerable small steamers, and Messrs. Barclay the brewers, on the opposite bank of the river, may pour forth into the atmosphere without molestation whatever quantity of carbon they may find convenient. The Commissioners of City Sewers will immediately attend to any case your Correspondent may point out.

W.S.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 16th March*, 1853.

176. Order of the Bath—Return.
198. Tithe Commission—Return.
217. Blackburn Election—Minutes of Evidence, &c.

*Delivered on 17th March.*

209. Kingston-upon-Hull Election—Minutes of Evidence, &c.
222. Malt—Account.

*Delivered on 18th March.*

220. Sandhurst College—Return.
231. Clergy Reserves (Canada)—Account of Payments out of the Consolidated Fund.
228. Bill—Sheriff Courts (Scotland), No. 2.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

### *From Gazette*, 18th *March*, 1853.

*Dated* 10*th Feb.*

353. W. E. Newton—Instruments for examining internal parts of the body.

*Dated 25th Feb.*

474. J. Hynam—Manufacture of wax and other tapers.

*Dated 28th Feb.*

497. Baron T. von Gilgenheimb—Agricultural machine.
499. T. E. Merritt—Railway carriage, &c.
501. E. H. Bentall—Improvements in harrows.
503. P. A. Fontainemoreau—Drying cigars. (A communication.
505. S. C. Lister—Heating and making cards.

*Dated 1st March.*

507. T. and C. Littlewood—Machinery in preparation of wool, silk, &c., to be spun.
509. J. C. Daniel—Propelling vessels and also carriages.
511. E. Charlesworth—Bill or letter-holders.
513. C. Hude—Evaporating, generating steam, heating, and production of gas.
515. R. L. Bolton—Power by explosion of gases.

*Dated 2nd March.*

517. C. H. Hall—Cooking by gas.
519. J. Abbott—Winding-machines.
521. J. and W. H. Smith, and A. Williams—Metallic plates, and production of ornamental patterns.
523. L. Jennings—Speed regulator.
525. R Weddell—Steam-engines.
527. W. T. Monzani—Reaping-machinery.

*Dated 3rd March.*

529. J. Murdoch—Manufacture of iodine. (A communication.)
531. C. Humpage—Materials for coffin furniture.
533. A. E. L. Bellford—Locomotive and other engines.
535. S. Colt—Rotating breech fire-arms. (Partly a communication.)
537. S. Colt—Machinery for forging metals. (Partly a communication.)
539. B. Chaussenot—Aërating liquids.
541. J. Wright—Machinery for manufacturing bags of paper, &c.
543. J. Waterman—Treatment of grains for production of food for cattle, &c.

*Dated 4th March.*

544. J. Hinks—Metallic pen.
545. R. C. Ross—Machine for cutting files, &c.
546. G. Elliott—Manures.
547. J. S. Hall—Cutting out boots and shoes.
548. W. Sandilands—Hopper for pianoforte.
549. S. H. Huntley—Regulating flow and pressure of gas.
550. H. M'Evoy—Covered buttons.
551. G. W. Bott—Pressers.
552. J. Brydell—Bedsteads.
553. J. D. M. Stirling—Manufacture of coated metal.

*Dated 5th March.*

554. M. A. Smith—Toys, models, and articles of ornament and utility.
555. J. Gedge—Fire-arms and loading same.
556. B. F. Weatherdon and C. Dealtry—Floating vessels and propelling.
557. T. W. Cross—Portable fire-engine.
558. W. Todd—Steam-engines.
559. J. Maudslay—Propeller.
560. R. A. Brooman—Machinery for pipes and tubes.
561. J. Hirst—Stretching fabrics.

*Dated 7th March.*

562. R. Barter, M.D.—Cutting roots, &c.
363. W. Barrington—Life-boats.
564. J. G. Lynde—Pressure governor for water.
565. H. Mapple—Electric Telegraphs.
566. A. Calles—Manufacture of typographic characters.
567. J. F. D. de Bussac—Paving, &c. (A communication.)
568. G. Simon and T. Humphreys—Carriages.
569. W. Matthews—Improvements in pianofortes.
570. J. J. W. Watson—Illuminating apparatus and production of light.
571. T. W Dodds—Manufactnre of iron and steel.
572. C. Parker—Weaving.
573. J. Little—Cooking apparatus.
574. T. W. Dodds—Wheels and axles.
576. T. T. Chatwin and R. M'Leish—Rollers, rods, &c., window-blinds, maps, &c.

*Dated 8th March.*

578. C. Finlayson — Converting reciprocating into rotatory motion.
579. T. J. Perry—Cornice-poles, picture, and curtain-rods.
580. T. Dryland—Portable iron stove.
581. J. F. Pinel—Deodorising sewage-water, &c.
582. N. Schmitt—Cleansing and separating ores and coal.
583. C. Baker—Moulds for bricks.
585. J. Wright—Bedsteads and other frames.
586. A. Samuelson—Bricks and tiles.
587. F. W. Emerson—Obtaining tin from ores.
588. J. Veevers and H. Ashworth—Preparing cotton, &c., for spinning.
589. T. Glover—Construction of buttons, &c.
590. J. Colquhoun—Bleaching silk, &c.
591. J. J. A. Macarthy—Gunnery and projectiles.

*Dated 9th March.*

592. J. Kimberley—Gas-stove.
594. S. Blackwell—Strap for connecting harness, &c.
598. W. Pidding—Manufacture of caoutchouc and gutta percha, and fabrics of same, &c.
600. T. J. Nash—Churns.
602. E. M. Stapley—Dressing flax, &c.
604. W. A. Holscamp—Castor for furniture.

### APPLICATION WITH COMPLETE SPECIFICATION FILED.

593. J. Hogg, jun.—Machinery for cutting paper. (March 9 1853.)

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 19th March*, 1853.

12. Thomas Wood Gray, of Warkworth-terrace, Commercial-road, Limehouse—Improvements in steam-engines.
377. Martyn John Roberts, of Woodbank, Gerrard's-cross, Buckinghamshire— Improvements in galvanic batteries, and in obtaining chemical products therefrom.
435. John Goodman, of Hazel-grove, Chester—Invention of an improved fountain-pen.

508. William White, of Cheapside—Invention of an improved fabric suitable for ventilating hat-bodies.

553. Charles Frederick Bielefield, of the Strand—Improvements in billiard and bagatelle-tables.

593. Edward Samson, of Leeds, Yorkshire—Improvements in machinery for preparing to be spun hemp, flax, tow, wool, silk, cotton, and other fibrous materials.

832. John Beale, of East Greenwich, Kent—Invention of an improved arrangement of steam-engine, and an improved packing to be used therein.

1139. John Livesey, of New Lenton, Nottingham—Improvements in lace-machinery, and in piled fabrics made from such machinery.

1189. Benjamin Glorney, of Mardyke Mills, near Dublin—Improvements in obtaining and applying motive power.

38. William Edward Newton, of 66, Chancery-lane—Improvements in roving, spinning, or twisting cotton or other fibrous substances, which invention he denominates, "Larwill's Improvement." (A communication.)

39. William Edward Newton, of 66, Chancery-lane—Improvements in the construction of bearings or steps for shafts, turntables, or moveable platforms, which invention he denominates, "Parry's Improvement."

85. William Nairne, of South Inch Mill, Perth, N.B.—Improvements in reeling yarns or threads.

111. Thomas Cropper Bayley, and Edward Evans, of Haigh Foundry, near Wigan—Improvements in the construction of wrought iron wheels, to be used upon railways or for other purposes, and in the machinery or apparatus connected therewith.

*Sealed 23rd March*, 1853.

18. Thomas Dickason Rotch, of Furnival's-inn—Improvements in treating peat, and in manufacturing fuel and other products therefrom.

76. Christopher James Schofield, of Cornbrook, Hulme, Lancaster—Improvements in machinery or apparatus for cutting the pile of fustians, and other fabrics.

90. John Aspinall, of King William street, London—Improvements in evaporating cane-juice and other liquids, and in apparatus for that purpose.

100. William Potts, of Birmingham—Improvements in sepulchral monuments.

107. Henry Columbus Hurry, of Adam-street, Adelphi—Invention of a fountain-pen or reservoir pen-holder.

178. William Edward Newton, of 66, Chancery-lane—Improvements in stoppers for bottles, and other similar vessels.

189. Alexander Willison, of Manse of Dundonald, county Ayr—Improvements in thrashing machinery.

216. Archibald Brown, of Glasgow—Improvements in the construction of sheaves for blocks.

220. David Stephens Brown, of 2, Alexandrian-lodge, Old Kent-road—Invention of an improved apparatus or instrument for evaporating or distilling liquids.

226. Diego Jimeuze, of Percy-street—Improvements in the manufacture of soap.

252. Jacob Tilton Slade, of Pall Mall—Invention of an improved mode of driving certain machines, and an improved driving band or chain to be used therewith.

267. Thomas B. W. Gale and Jonathan Tenson, of Homerton—Improvements in the means of joining or coupling bands or straps.

280. William Bissell, of Wolverhampton—Invention of an improved cramp, or improved cramps, for cramping floors, doors, and joiners, and ship work generally.

310. William Edward Newton, of 66, Chancery-lane—Improvements in the construction of hydraulic rams.

352. Thomas Dawson, of Melton-street—Improvements in the means of cutting pile or terry fabrics.

353. Thomas Lacey, of Grafton street—Improvements in apparatus for raising liquids and in joints for uniting India-rubber, and other like flexible tubing.

361. Joseph Pimlott Oates, of Lichfield, Staffordshire—Invention of an improved spring, or improved springs, for carriages.

388. Alsop Smith, of Westminster—Improvements in the manufacture of fire-wood.

455. Auguste Edouard Loradoux Bellford, of 16, Castle-street, Holborn—Improvements in cocks or taps.

584. George Thomas Selby, of Smethwick Tube-works, Birmingham—Improvements in steam-boilers.

586. George Thomas Selby, of Smethwick Tube-works, Birmingham—Improvements in machinery for the manufacture of tubes and pipes.

610. William Edward Newton, of 66, Chancery-lane—Improvements in the manufacture of capsules or covers for bottles and other hollow articles.

612. James Dible, of Northam, Hants—Improvements in ventilating and heating ships, which improvements are also applicable to extinguishing fire on board ship.

647. John Henderson Porter, of Birmingham—Improvements in the construction of portable buildings and other structures.

686. Nelson M'Carthy, of Cork—Improvements in boots and shoes.

714. Henry Huart, of Cambrai, France—Improvements in the storing and preservation of grain.

806. William Dray, of Swan-lane, City—Improvements in machinery for crushing, bruising, and pulverising.

828. Michael Leopold Parnell, of Little Queen-street, Holborn—Improvements in the construction of box-staples and striking-plates.

884. Robert Barnard Feather, of Liverpool—Improvements in the construction of ships, and in rendering ships and boats impervious to shot.

892. Daniel Woodall, of Oldbury, Worcester—Improvements in canal-boats.

958. Alexander Laurie, of Chatham, Kent—Improvements in the manufacture of oars and other similar articles.

35. Edme Augustine Chameroy, of Paris—Invention of a new composition of different metals or metallic substances.

137. John Crabtree, of Heywood, Lancashire—Improvements in machinery for winding and doubling yarns.

146. Augustus Thomas John Bullock, Lieut. R. N.—Improvements in taps and cocks.

158. William Joseph Curtis, of 23, Birchin-lane—Invention for excavating or digging earth, and for carrying or delivering the soil.

174. David Clovis Knab, of Rue Rosini, Paris, and 4, South-street, Finsbury—Improvements in the process of and apparatus for distilling certain vegetable and mineral matters, and also animal bones and flesh.

187. Frederick Simpson, of Red-hill, Surrey—Improvements in combining materials for cleansing or whiteing stone.

189. Alfred Vincent Newton, of 66, Chancery-lane—Improvements in the manufacture of printing surfaces. (A communication.)

191. Robert William Siever, of Upper Holloway, and Robert William Waithman, of High Bentham, West Riding, Yorkshire—Improvements in bleaching animal and vegetable fibrous materials.

193. John Edward Mayall, of Regent-street—Improvements in the production of crayon effects by the Daguerrotype and Photographic processes.

200. John Henry Johnson, of 47, Lincoln's-inn-fields, and Glasgow—Improvements in the method of lubricating machines, and in the mechanism or apparatus employed therein. (A communication.)

201. James Coombe, of Belfast—Improvements in machinery for heckling or combing flax and other fibrous substances.

212. William Tranter, of Birmingham—Improvements in firearms.

216. George Edmond Donisthorpe and John Crofts, of Leeds—Improvements in combing wool, hair, or other fibrous materials.

217. James Pole Kingston, of 5, Lewisham-road, Kent—Improvements in combining metals for the bearings and packings of machinery.

219. John Scott Russell, of Great George-street, Westminster—Improvements in constructing ships and vessels propelled by screw or such like propeller.

223. Harold Potter, of Darwen, Lancashire—Improvements in the mode or method of producing a certain colour or colours on woven or textile fabrics and yarns, and in the machinery or apparatus connected therewith.

226. Henry Moorhouse, of Denton, Lancashire—Improvements in the mode or method of preparing cotton, wool, flax, or other fibrous material, and in the machinery or apparatus employed therein.

231. Richard Archibald Brooman, of 166, Fleet-street—Improvements in diving-bells and apparatus to be used in connection therewith. (A communication.)

234. William Watson Hewitson, of Springfield-mount, Leeds—Improvements in suspending or applying mariners' compasses in vessels built of iron or partly of iron.

240. William Edward Newton, of 66, Chancery-lane—Improvements in machinery for dressing cloth. (A communication.)

257. Israel P. Magoon, of the State of Vermont, United States of America—Invention of a new and useful improvement in steam-boiler chimneys.

272. Joshua Murgatroyd, of Heaton Norris, Lancashire—Improvements in the construction of boilers and apparatus connected therewith.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| March 21 | 3433 | Inkstand | George Dowler | Birmingham. |
| " 23 | 3434 | The Sociable Carriage step and Cover | Booker and Son | Edmonton. |

# SOCIETY OF ARTS.

## FRIDAY, APRIL 1st, 1853.

The Institutes' Committee invite attention to the following important communication which has been made to them, on the circulation of newspapers in the United Kingdom, and the taxes thereon. The subject forms a portion of the general inquiry into the operation of the present fiscal restrictions on Paper, Advertisements, News, and Foreign Books, which, it will be remembered, the Committee is charged by the Council to investigate:

The returns of the number of stamps issued to newspapers in 1837, being the first year of the reduction of the Stamp-duty from 3½*d.* to 1*d.* each for the United Kingdom, shows that 48,165,562 penny stamps were issued to 444 newspapers, being an average of 108,481 stamps for each paper. Of these, 27,983,779, or an average of 325,392 were issued to 86 newspapers published in London, being more than half the whole number issued in the United Kingdom; 1,083,465, or an average of 180,577 stamps were issued to 6 Manchester newspapers; 823,865, or an average of 82,386, to 10 Liverpool papers; 699,000, or an average of 233,000 to 3 Leeds newspapers; and 518,507, or an average of 86,418 to 6 York newspapers, making together 31,108,616 penny stamps issued to 111 newspapers in those five places, being about *two-thirds* of the whole number of stamps issued to newspapers in the United Kingdom, leaving but 17,256,951 for all the other places.

The number of penny stamps issued to 188 English provincial newspapers in 1837, exclusive of those in Manchester, Liverpool, Leeds, and York, was 9,637,615, or an average of 51,264, being about 985 per week; the number issued in Scotland to 51 newspapers was 3,553,462, or an average of 69,676, or 1,339 per week; to 81 Irish newspapers, 3,463,314, or an average of 42,757, or 822 per week; and to 13 Welsh newspapers, 402,555, or an average of 30,695, or 590 per week: together, 17,256,951.

The returns for the year 1850 show that 79,760,177 penny stamps were issued to 776 newspapers and trade circulars in the United Kingdom, being at the rate of 101,495, or 132,000 for the newspapers. Of these, 48,019,455, or an average of 162,778, were issued to 295 newspapers and trade circulars in London, the average issue to the newspapers being 290,700 each; 2,048,227, or an average of 204,822 to 10 newspapers in Manchester; 1,613,640, or an average of 124,126, to 13 newspapers in Liverpool; 890,000, or an average of 296,666 to 3 newspapers in Leeds; and 530,200, or an average of 106,040, to 5 newspapers in York: together, 53,101,522, or two-thirds of the whole, leaving but 26,658,655 for all the other places in the United Kingdom. The number of stamps issued to the other 215 English provincial newspapers was 13,579,377, or an average of 63,625, or 1,262 per week; the number issued to 125 Scotch newspapers was 6,582,692, or an average of 52,661, or 1,010 per week; to 110 Irish newspapers, 5,855,354, or an average of 53,230, or 1,024 per week; and to 17 Welsh newspapers, 641,242, or an average of 37,720; together, 26,658,655: total, 79,760,177 penny stamps.

Of the 6,582,692 penny stamps issued to 125 Scotch papers, 2,763,305, or an average of 52,138, were issued to 53 newspapers, &c., in Edinburgh; 2,341,995, or an average of 101,826, to 23 papers in Glasgow; and 290,760, or an average of 58,152, to 5 papers in Aberdeen: together, 5,396,060, leaving 1,186,532, or an average of only 25,245, or 485 stamps per week for the 47 other papers in Scotland.

Of the 5,855,354 penny stamps issued to 110 Irish newspapers, 3,460,354, or an average of 93,523, were issued to 37 Dublin newspapers; 638,650, or an average of 106,441, to 6 Belfast papers; and 509,500, or an average of 169,833 stamps to 3 Cork papers: together, 4,608,504, leaving 1,246,850, or an average of 19,482, or 375 per week, for the other 64 Irish papers.

From this it appears that the greater number of 1*d.* stamps are issued to newspapers in the metropolitan cities; for instance, the number of newspaper stamps issued in England and Wales appears from the returns to have been in 1850, 67,322,141; out of which 48,019,455 were issued to London newspapers, including 17,481,390 stamps to six daily papers, of which the *Times* had 11,900,000, and 3,779,450, or an average of 629,908 to six evening papers, leaving 19,302,686 for all the other cities and towns in England. The number of stamps issued to newspapers in Scotland in 1850, was 6,582,692; of which 2,763,305 were issued to newspapers in Edinburgh, leaving 3,819,387 for the other places in Scotland, of which Glasgow absorbed 2,341,995, being together with those for Edinburgh, 7-ninths of the whole. The number of stamps issued to Irish newspapers was 5,855,354; of which 3,460,354 were issued to newspapers in Dublin, being about three-fifths of the whole.

It would appear from the gradual increase in the number of stamps issued, that the reduction from 3½*d.* to 1*d.* per stamp, had a very beneficial effect in increasing the number of stamps, and consequently the circulation of stamped newspapers. For in the first year after the reduction in the duty, the number of stamps increased about 15,000,000, or above 40 per cent. over those issued the preceding year; and in the course of nine years afterwards they increased 30,000,000, or above 60 per cent. over the first year the penny stamp came into operation. Taking the produce of the 3½*d.* stamp duty in the last year of its existence, it will be found to amount to 501,000*l.*; while in 1846, the penny stamp, including supplements, produced a revenue of about 345,300*l.*; and in 1850, of 356,000*l.*; so that although the aggregate amount of duty was reduced, say, 306,000*l.*, or more than 60 per cent., the effect of the reduction in the first year on the revenue was only 276,4[illegible]0*l.*, or to the extent of 55 per cent. This measure produced an effect so far in favour of the revenue, that during the following nine years the reduction in the revenue, as compared with the year prior to the reduction, amounted only to 145,000, or 31 per cent., instead of 306,000*l.*, or 60 per cent. in 1836.

It is fair to presume, from the progressive increase in the number of stamps issued during several years prior to the reduction of stamps on newspapers, that even if the 3½d. duty were retained, that the number of newspaper stamps issued would have increased in proportion to the increase of wealth and population, but only to a certain limited extent, depriving a large number of intelligent and industrious persons in the kingdom of useful information, while the great mass of the people would be much more excluded than at present from anything in the shape of news, or accounts of passing events.

It may be well to mention that the increase in the number of stamps issued during the first year the penny stamp came into operation was 50 per cent. more than the increase that had taken place in the number of stamps issued at 3½d. during twenty years previous to the alteration. In five years after the stamp duty was reduced to 1d. the increase was 27,500,000, being 7,000,000 more than the total increase for thirty-five years previous to the reduction; and in nine years after the alteration, the issue of stamps to newspapers nearly doubled that of 1836. The increase in the number of stamps was not so much in a regular series, year after year, as by starts every two or three years, on occasions of public excitement, each rise maintaining its ground in spite of the restrictive operation of the taxes, and owing probably to the increasing prosperity of the country. The increase in the number of 1d. stamps issued to papers in the United Kingdom from 1837 to 1850 inclusive, appears to have been 25,682,197, exclusive of the ½d. stamps, or 48 per cent.; but including them 30,594,615; namely, 24,573,355 in England; 3,029,230 in Scotland; and 2,392,040 in Ireland. The increase, from 1837 to 1850, in the number of London newspapers was seventy-four, and in the penny stamps 20,035,455; in the number of Liverpool papers three, and in the stamps 789,785; in the number of Manchester papers four, and in the stamps 964,762; in the number of Leeds papers 0, and in the stamps 191,000; in the number of York papers a decrease of one paper, and an increase of 11,693 in the penny stamps; making the total increase of penny stamps in these places 21,992,595, and leaving 2,580,760 as the increase for the other places in England and Wales, of which the latter showed an increase of 238,693 stamps and four newspapers.

The increase, from 1837 to 1850, in the number of Edinburgh newspapers, was 43, including 21 trade-circulars, and in the number of penny stamps 1,413,922; in the number of Glasgow papers 13, including 5 trade-circulars, and in the number of penny stamps 1,372,675; in the number of Aberdeen papers 2, and in the number of penny stamps 35,135,—making together an increase of 2,821,732 penny stamps, and leaving but 207,498 as the increase for all the other places in Scotland.

The increase during the above period, in the number of Dublin newspapers, was 14, including 3 trade-circulars, and in the number of stamps 1,828,250; in the number of papers in Belfast 1, and in the number of stamps 372,932; but in Cork the number of newspapers showed a diminution of 3, and an increase in the number of stamps of 65,666,—making the total increase in these places of 2,266,848 penny stamps, leaving but 225,192 as the increase of penny stamps for all other places in Ireland.

It must be evident, from the limited circulation of the majority of the newspapers in the United Kingdom, and the heavy amount paid in taxes on paper, stamps, and advertisements, that they cannot yield a remunerative return to those employed on them. The taxes together amounted to about 585,000*l*. in 1850, making on the 593 newspapers published in the United Kingdom an average tax of 986*l*. a year on each newspaper establishment; of course varying in amount from a few hundreds a year to several thousands, according to the circulation of the paper, and the number of advertisements inserted therein. The amount levied in this way on the *Times* newspaper probably amounted to not less than 75,000*l*., including about 15,000*l*. for paper duty.

Estimating the number of persons employed in the editorial and reporting departments of all the papers in the United Kingdom at ten each, which is certainly above the average, the present taxation amounts to nearly 100*l*. a year per man. This is a matter for the public to consider, whether it is a judicious tax, and calculated to raise the character or reward the efforts of the 5,930 men employed in the production of the greater part of the news and information contained in the newspapers of the United Kingdom, to say nothing of the limited circulation caused thereby, and comparatively high price of the newspapers, placing them beyond the reach of millions.

Although 5,930 has been mentioned as the number of men, it is by no means probable that half the number are employed on the papers adverted to, as it is no unusual thing for men to work for two or three newspapers, and write something for other papers and magazines besides, in order to get sufficient funds to make "two ends meet." This would make the 100*l*. a year tax amount, on the average, for each man, to about 200*l*. a year, and probably on the *Times* to 1,000*l*. a year.

One result of the heavy taxation is, that deserving men are in many cases overworked and underpaid, while there can be no doubt the public is, at the same time, with a few exceptions, badly served. It may not be generally known that a great number of newspapers in the country do not pay their working expenses, but are kept in existence entirely for party purposes, and of course having little or no sympathy with the public interests. These papers occupy the place, in various towns and districts, which more independent and useful journals could supply, if the present taxation were removed. Had newspapers been generally established for commercial purposes, to pay in return for a faithful devotion to the public interests, as many people suppose, the enormous taxation on newspapers and advertisements could not have been tolerated for so many years in this free and commercial country. There are, unfortunately for the public interests, but very few proprietors of newspapers in favour of the removal of the present taxation, as several of those gentlemen imagine the result would not be advantageous to them; although few persons seem to doubt that the advantages to the public, on the removal of the whole of the taxes on knowledge, would be considerable, in an educational and commercial point of view.

There is another matter connected with the Taxes on Newspapers which seriously affects the interests of the public; it is the Duty on Advertisements. It would be impossible to estimate accurately the extent of injury that has been inflicted on trade and industry by the restrictions, by taxation, on Advertisements in Newspapers; and were it not for other modes of advertising, by which the duty has been evaded, the injury would probably have been much greater. To give an idea of the effect of the duty in preventing the increase of advertisements, it is necessary, in the first place, to mention that the duty on each advertisement, before the reduction, in 1833, was 3*s.* 6*d.* in Great Britain, and 2*s.* 6*d.* in Ireland. With regard to the number of advertisements, official returns show that 648,840 advertisements were inserted in the year 1810 in newspapers in England and Wales; 85,949 in Scotland; and about 96,000 in Ireland, together 831,789 advertisements, producing a revenue of 140,541*l.* The number of advertisements inserted twenty years afterwards, in the year 1832, was, for England and Wales, 783,557; for Scotland, 104,447; and for Ireland, 121,991; total, 1,009,995 advertisements, producing a revenue of 170,649*l.* The result shows how effectually the taxation had prevented the increase of advertisements in the United Kingdom; for during a period of twenty years the increase in the number of advertisements was only 178,206, being about 21 per cent., or 1 per cent. per annum. In the year 1833, the duty was reduced from 3*s.* 6*d.* to 1*s.* 6*d.* on advertisements published in newspapers in Great Britain, and from 2*s.* 6*d.* to 1*s.* each for those inserted in Irish newspapers. The beneficial result of this reduction was shown in the first year after the reduction in the duty was made. The number of advertisements inserted in the year 1834, in newspapers in England and Wales was 977,441; in Scotland, 134,864; and in Ireland, 162,614; together, 1,274,919; showing an increase of 265,000 advertisements over 1832,—the last year of the high duty being 86,794 advertisements, or 50 per cent. more than the total increase in the number of advertisements during the twenty years previous to the reduction of the duty. It may be remarked, that during the ten years previous to the reduction, the aggregate increase in the annual number of advertisements was very small, not being above 8,000; but during the ten years after the reduction the increase was 700,000.

The increase in the number of advertisements during fourteen years, prior to the alteration, was 103,895; but in fourteen years after the reduction in the duty, the increase was 1,170,000, or more than eleven times that number. The revenue, from the duty in the year before the alteration, amounted to 170,649*l.*, and in 1850 to 163,038*l.*, being only a difference of 7,611*l.*; and showing that the reduction in the duty had brought into existence a large number of advertisements that could not have appeared under the former restrictions. During the five years previous to 1850 the increase in the number of advertisements has not been above 100,000, showing that the 1*s.* 6*d.* advertisement duty has been nearly fully developed; and, therefore, judging from former returns, it is not capable of much further increase. The total number of advertisements inserted in newspapers in the United Kingdom in 1850 was 2,252,550, or 1,252,550 more than in 1832. From the result of the foregoing, it may be fairly anticipated, that by removing the duty altogether, in the course of ten or twelve years that the number of advertisements would gradually increase to ten times their present amount, and thus confer a great benefit on the trade and commerce of the country.

## DUTIES ON PAPER, NEWS, &c.

QUERIES PROPOSED BY SOCIETY OF ARTS,
March 8, 1853.

The following is an Abstract of the Replies received to the Circulars issued on this subject, from which it appears that

From Institutions in Union..135 have been returned.
„ „ *not* in Union..109 „ „
Total...... 244

Query 1. Has your Institution a News-room; and how does it answer?

Of these 244 Institutions it appears that the following have NEWS-ROOMS.

Institutions in Union.... 118
„ *not* in Union 85
203

NO NEWS-ROOMS.

Institutions in Union.... 17
„ *not* in Union 24
41

Total ........ 244

To the query, "How does it answer?" by far the greater number of replies state—Very well—well attended—aids its prosperity very much—most popular feature—one of the chief attractions—much frequented—assists in supporting Institution—as well as can be expected, with limited supply of newspapers—since introduction of newspapers have added one member per week, and increased in number from 30 to 220—admirably, without it could not keep Institution afloat—means of placing Institution in a healthy and prosperous condition—established last November, large accession of members in consequence—indispensable for maintenance of Institution—means of bringing great number of members—much frequented by all classes, and would be more so, if the price of admission were reduced, which is impracticable at present, because of the cost of newspapers—self-supporting since commencement—capable of much improvement by reduction of paper duties—one-third support of Institution—leading feature—place of general resort for all classes—great number of subscribers with an eye to newspapers only—remarkably well; without it, would be unable to keep up Institution—great attraction to business men—well appreciated, and every effort made to extend it. . . . . .
In a few instances, the replies state that it is tolerably attended, but does not fully pay its expenses; and in two instances, that a News-room has failed to attract. . .
Others say, that a News-room has been in contemplation, but the price of papers has prevented intention being carried out.

Query 2. What number of London Daily Papers, London Weekly Papers, Provincial Papers, Serials, and Quarterlies, do you take in; and how far does the cost in each class affect the supply?

The number of papers and periodicals taken in by the 203 Institutions which have News-rooms, is—

| | Total. | Average. |
|---|---|---|
| London Daily Papers...... | 534 | 2½ |
| London Weekly Papers.... | 540 | 2¼ |
| Provincial Papers ........ | 737 | 3½ |
| Serials ...................... | 1,588 | 7¾ |
| Quarterlies ................ | 211 | 1 |

The replies state—That the cost materially limits the supply in all cases—were the price much less, one-fourth, one-third, and even double the present number would be taken in—only able to take what they do by letting them during the day when the news-room is not opened till the evening; and also by selling the papers at about half-price the day after publication—by these means the whole cost has been paid—would be glad to file London papers, if they were not obliged to sell them—the cost of London papers frequently prevents provincial papers being taken in, and quarterlies are quite excluded—cost prevents as many as necessary to give satisfaction—compels them to be content with a supply insufficient for the number of members—in some cases, large proportion of income necessarily expended on newspapers.

### Query 3. Which class is most sought after by readers; and do any difficulties arise in consequence of the demand for that particular class?

The general answer is, Newspapers, and especially the London daily papers. In a few cases serials seem to be preferred, arising, as it would appear, from that particular Institution being looked upon more as a reading than a news-room. In others, the demand is said to be pretty equal, owing to the papers and periodicals being voted in each quarter, and being thereby regulated and proportioned to the demand for each class and paper. The second part of the question is not generally strictly and literally answered; but the replies almost invariably state, Yes, from inadequate supply — much inconvenience arises from restricted supply; having only one copy of each paper, causes loss of time, and often disappointment — sometimes bespoke two, three, four, and five deep, and members have to go away without "getting a read"—occasions dissatisfaction, and loss of subscribers—scarcity drives readers away. . . . A few say that they are not aware of any difficulties, as their arrangements prevent it.

### Query 4. Is Local News sufficiently attended to in the local papers; and if not, to what cause is the neglect attributable?

About two-thirds say, Yes; very fairly; tolerably well; quite sufficiently; no cause to complain. The other third say, No; generally meagre; the limited circulation of the provincial papers causes the rate of remuneration offered to be insufficient to command adequate talent—the want of a sufficient number of agents, in consequence, the local intelligence that does appear is generally an *ex parte* statement, and sometimes, when sent to editor is rejected. Another reason assigned is the high price of papers, and London papers in particular, which forces the provincial press to introduce a little from all quarters, making it thereby not local, but to serve the double purpose of both a local and general paper.

## CANADIAN POSTAGE REFORM.

The Report of the Postmaster-General of Canada and British North America, for the year ending April 5, 1852, gives the result of the first year's experience of a greatly reduced rate of postage. Previous to April, 1851, the postage on letters to and from all places within Canada and British North America was, on an average, about 9*d.* per half ounce. At that date, the rate was reduced to 3*d.* on the half-ounce letter; the local postage was also reduced from a penny to a halfpenny; and the postage on newspapers was repealed, with respect to a large proportion of those passing through the post. It was estimated that the number of letters would be doubled, and thus the revenue reduced one-third; but the result of the first year's experiment has surpassed that expectation, for the letters have increased in the proportion of 80,051 to 41,000 a week, and consequently the loss of revenue is less than was anticipated.

The Postmaster-General concludes his Report thus: "It is with much satisfaction that I express the opinion that the financial condition and prospects of the department, at the close of another year, will be such as to induce your Excellency at the next Session of the Legislature to recommend the adoption of a Penny Rate; with a full assurance that the improvement may be sanctioned without requiring, as I have already stated, more than a moderate aid from the General Revenue to sustain the operations of the department, until the Post Office receipts shall recover from the immediate effects of the reduction."

The Report includes the following paragraph upon the subject of Ocean Postage:—

"Public attention, both in Great Britain and in the Colonies and United States, has of late been greatly attracted to the expediency of reducing the present comparatively high rates of postage charged for the packet conveyance of letters between England and America, and it is to be hoped that the measure will, ere long, be favourably entertained by the Imperial Government; for no doubt the existing scale of charge operates severely to check correspondence, and bears with peculiar force in this country upon the poorer classes of emigrants in the first year after their arrival in the provinces, and whilst naturally most desirous to maintain an intercourse with their relations and connections left behind. If such a consideration were deemed to be of importance, it may be stated with perfect confidence that, as regards Canada, the present amount of packet postage collection might be maintained at a much lower rate of postage charge."

## ESSAYS ON CHINA AND THE EASTERN ARCHIPELAGO.

The object of Mr. Hammond, in offering these premiums, is to promote the interests of religion and commerce in the China Seas and Eastern Archipelago, in connection with the design of the Great Exhibition. It is proposed that a selection of the manuscripts be made, and the copyright of them be disposed of, and published with the name of each essayist attached, and the nett proceeds rateably allotted to the writers, or, with their consent, disposed of as may be considered by the judges most likely to promote the objects treated on; and it is particularly requested that such consent to the publication, and option as to the disposal of the proceeds, be forwarded by each party; but in the absence thereof, assent will be understood and acted upon.

In selecting from the contributions those MSS. which it is proposed to publish, it is intended to include all those containing valuable information, though not sufficiently complete or copious to entitle them to a prospect of the premiums; hence, any member of the mercantile community, willing to convey his practical opinions, and the result of his experience, in connection with the subjects to be discussed, will be offered a convenient opportunity of laying before the public such details. The contribution also, on the part of persons in official positions, of statistical tables, and other similar information they may be in a position to afford, will materially aid in rendering the proposed volumes more complete.

In selecting the gentlemen named as judges, it has been thought desirable not to include parties directly engaged in the commerce of the China Seas, with the view of ensuring the fullest confidence in the strict impartiality of the awards, and the avoidance of any possible bias in considering the merits of any question discussed, upon which difference of opinion may exist—the main object being to collect a body of evidence bearing on the present state of religion and commerce in the important countries encircling the China Seas, furnished chiefly by parties possessing practical experience on the subject—difference of opinion, of course in a sound direction, being freely permitted; and the *pro* and *con* of each question being thus fairly brought together.

The importance of the subjects embraced will be apparent from the following facts:—The population of the countries alluded to may be estimated at more than four hundred millions—any suggestions, therefore, which may tend to promote Christianity, and extend civilization and commerce amongst nations now immersed in barbarism and idolatry, and numbering nearly one-half of the whole human family, cannot but be valuable:—The important subject of the Tea Duties, and their effect on Anglo-Chinese commerce, may be expected to elicit numerous useful facts and suggestions:—The Opium Trade, especially in connection with the expiration of the East India Company's Charter in 1854, and its effect on the trade, currency, and morals of China:—The collection of information on the sealed empire of Japan, and the causes of the singular fact that British relations therein were more developed two hundred years ago than at present:—The serious subject of piracy in the China Seas, and also in the Eastern Archipelago:—The inland restrictions placed on the transit and distribution of British manufactures in China, and other impediments to the development of trade, and the employment of shipping in the China Seas:—Observations on the present state of British Commerce in Java and the Phillipines, and suggestions for the removal of any existing restrictions thereon:—The state of Christian Missions in China and the Eastern Archipelago, and the probability of practical suggestions for their improvement and extension.

## RAILWAY ACCIDENTS.

### COMMUNICATION BETWEEN GUARD AND DRIVER.

The Board of Delegates of the Railway Clearing House have just made their Report on this subject. After alluding to the various contrivances that have been proposed for accomplishing this object, and describing some of the plans in use on foreign railways, the Committee state that they are "satisfied that no signals depending on sight, on distant sound, or on complex contrivances of any kind, can be so adapted to the varying circumstances of a railway train as to make the communication at all times certain, and that the only feasible means of accomplishing the object in view is by machinery, enabling the guard, when in his van at the rear of the train, to strike a bell fixed to the tender. The Committee, keeping in view that the mode selected must have the qualities of simplicity of construction, facility of adjustment, and certainty in action, is of opinion that the following plan will be found best suited to fulfil those conditions:—It is proposed that every tender should have a loud-sounding bell attached to it, at a point as close as possible to the place where the engine-driver usually stands; that the apparatus to be used for striking the bell be fitted with a contrivance for easily attaching a rope or line to it; that each guard's van be fitted with a drum having two divisions, the one smaller than the other; that the larger division be of sufficient capacity to hold, wound round the drum, a coil of line equal in length to the maximum length of the trains; that in the smaller division a cord be fixed to and wound round the drum, having a balance weight always in action suspended from the end of it, for the purpose of keeping the signal line in a state of tension; and that the lever of the bell be fixed down by a spring of sufficient strength to resist this counterpoising weight as well as the strain on the line at starting, and at other times, so that the bell may never ring except by the act of the guard; and, finally, that the signal line, when used, be carried along the carriages in the way in which experience may show to be the best, supported by spring receivers of a simple construction, and be attached to the lever of the bell. The guard, when desiring to make a signal to the engine-driver, will simply have to turn the handle of the reel and sound the bell, and when his journey is ended it will be his duty to detach the line from the bell and wind it round his reel."

## HOME CORRESPONDENCE.

### RAILWAY ACCIDENTS.

#### COMMUNICATION BETWEEN GUARD AND DRIVER.

Sir,—A more apparently crude and ill-considered scheme of mechanical operation than that publicly approved by the Committee of Delegated Railway Managers on the question of "establishing a communication between guards and engine-drivers," has seldom been set forth as the result of grave and impartial deliberation.

It is no doubt possible that the Committee may have had before them experimental facts and data upon which they came to a decision so apparently in opposition to the conditions laid down by themselves; but if so, they were certainly bound either to give the public the benefit of the same data, or they should not have attempted a description of the *modus operandi* at all, but simply have expressed a determination to recommend a particular plan, whatever their actuating motives might be—whether those of *economy*, or of *ésprit de corps*—in upholding a scheme that had emanated from one of themselves.

The first glaring discrepancy which strikes the reader of "the Report," is the insufficiency of the adopted plan to fulfil the conditions of the 26th and 27th paragraphs.

In the last of these it is stated that, "It is, in fact, indispensable, in consequence of these frequently recurring changes, and the rapidity with which they are made, that the means selected should be of easy application; and further, that it should be simple."

Well, then, supposing one of these frequently recurring changes to require the removal from the train of a carriage near the guard's van—in what way, according to the approved plan, is the operation to be effected?

First. The attachment to the bell must be detached.

Secondly. The guard must *reel up* the entire extent of the line—some half thousand feet or so—and, during this operation, a person must accompany the end of the line, as it is gradually wound up, in order to free it from its spring receivers and prevent tangling or jamming.

Thirdly. The carriage is removed.

Fourthly. The same person must walk back again, with the tow-rope over his shoulder, on which there will be a pretty smartish drag before he gets it back to the engine.

This is the operation that the Committee would have the public to believe may be performed with *rapidity* and *ease*—if, indeed, the Committee have not overlooked its necessity altogether; as, in the 34th paragraph of the

Report, they allude to the reeling operation as only to be performed by the guard "when his journey is ended."

But what is to become, all this time, of the "balance weight" on the smaller drum? Is it to be detached for the nonce, or is it expected to have sufficient fall, *within the limits of the guard's van*, to take up "a coil of line equal in length to the maximum length of the trains?" In paragraph 33 this balance weight is stated to be "always in action." What practical fall can be given to it? What is the amount of its estimated maximum weight? is it to be half a pound, or half a ton? What is the maximum friction of the line in its bearings? What amount of *resistance* must be given to *the spring* which is to "fix down the lever of the bell," in order to resist sudden extensions of the train? Will the gutta percha line be capable of resisting, when under a strain, the influence of a hot sun?

Answers to these questions would constitute some of the data which must be supposed to have been taken into consideration by the Committee, and which they certainly ought to have extended to the public at large in justification of the decision they have arrived at.

Yours, &c.,
INQUIRER.

## LOWERING BOATS.

Blue Town, Sheerness, March 23rd, 1853.

SIR,—With reference to your journal of March 4th, I beg to submit the accompanying contribution towards improving the means of lowering boats at sea.

The boat is to be suspended as usual on the davits, the upper sheaves of the tackle being fixed in the head of the davit, and having such obliquity to an athwartship line as shall direct the falls to other sheaves, having the same obliquity, fixed in the head of a stanchion, which is fitted on the inside of the bulwarks between the davits: by this means the falls are directed together to a barrel let into the ship's side, round which a sufficient number of turns is taken to prevent slipping. The barrel is, of course, either grooved or hollowed laterally, so that the two parts of the ropes rendered from it may remain vertical in the process of lowering; the slack of the fall is belayed round a cleat, by the friction on which the velocity of descent must be regulated. I cannot but think this preferable to the employment of a friction break, with the use of which seamen generally are unacquainted. The boat may be raised by a winch; or, should the cost of fitting it be too great, the barrel may be turned by short bars inserted in holes at its extremities; in either case there will be one man to take in and belay the slack.

Another and most important desideratum remains in the means of unhooking the tackles; and here I may be permitted to say that I believe it absolutely necessary that the persons in the boat should have the means of effecting this, instantly and without risk of failure: if they do not possess this means, but the tackles are necessarily loosed when the weight is taken off them, and therefore before the oars can be manned, the chances are the boat will be drawn under the counter and swamped. I think it cannot but appear desirable that one tackle should be kept fast until the boat be under command: I propose, therefore, to suspend it by two hooks, in the same way as some of Her Majesty's ships are now fitted, that is, to have a long bar hooking to a ring bolt in the keelson, and passing through a slot in the thwart, with another hook at its upper extremity to receive one on the davit block; but in this last I would suggest an alteration.

Let the hook be forged separate from the shank, and have the shape of the letter U curved outwards at its extremities; and let the lower part of the shank be flattened so as to pass between the two sides of half the hook. Then put a pin through all at a little distance from the shank side of the middle of the hook, to act as a pivot about which the hook may turn when the ring which unites its sides with the shank is slipped up. With one side thus united we have an open hook; with the other, the hook is close. For raising the boat in rough weather, it will be found necessary to hook on with the former, and, having hooked, to slip up the ring and transform to the latter. Instead of the hook on the suspending bar, we may have a closed eye of sufficient length to allow the hook to fly out on letting go the boat.

The foregoing method is yet liable to the objection—the value of which can only be determined by experiment—that one of the ropes may foul in the blocks (an accident over which the barrel has no control); it can only be answered, that since like quantities of fall are rendered at both ends, and they are subject to a great strain, the accident is very improbable: this improbability is increased as we decrease the mechanical advantage on the pulley, and so avoid complexity. In Her Majesty's ships, therefore, and others where there is no lack of manual power, I should advise the following adaptation of the above plan:—Let the boat be raised by the two blocks on the davits, as is usual, the men manning the falls and running the boat up, securing it temporarily; then, retaining the barrel and stanchion before suggested, and one of the sheaves on the davit head, let two ropes pass over them and shackle to the suspending bars, taking care to make them as much larger than the tackle fall as is indicated by the mechanical advantage of the pulley. When these are secured, the pulleys may be taken down from the davits and stowed in a dry place; the lowering will be effected as before, with less risk of failure.

It will be seen that, had a communication been made between the davits on the inside of the ship by ropes or bars, without the use of the stanchion, these ropes or bars would have interfered with the working of the guns, and have been themselves liable to injury.

Yours,
NATHANIEL BARNABY, Jun.

## PHOTOGRAPHY.

SIR,—I am anxious to call the attention of the readers of the Journal, and particularly those who practise photography, to the importance of carefully fixing the positive pictures. Indeed, too little care is taken on this head generally. I am induced to make the above remarks in consequence of having a few days since examined the photographs lately exhibited at the Society's rooms, which have been lent or given to the Society for Exhibition at the Institutions in Union. Half of them, at least, are changing colour, becoming stained and spotted, and are unfitted for show, though so short a time has elapsed since they were made. All this arises from carelessness in fixing, and may be avoided. For instance, I have some by me which have been taken upwards of four years, and though exposed to the light during all that period, exhibit no symptom of change. Photographers are too apt to exert all their energy in producing good negatives, and neglect their positives.

F.

## DUTY ON PAPER.

SIR,—Resuming the subject of the operation of the Paper-duty, the next class, a numerous and important one, upon which it acts very prejudicially, is composed of those through whose hands a large quantity of paper passes, undergoing various operations previous to being issued to the public. These middlemen comprise newspaper-proprietors, publishers, paperhanging manufacturers, card, and box-makers, &c., &c. And first, with reference to newspapers. I may premise that in the following remarks I express no opinion on the politics or religion of the papers. I refer to them simply as media of information, which I desire to see conducted with high literary talent, and on moral principles. It will not be contended that any newspaper could be supplied merely in consequence of the repeal of the duty at a cheaper rate than at present, and very little argument is necessary to prove this fact. If we take the case of the *Times*, or any other leading Journal, the duty does not amount to one farthing per number. The *Times*, therefore, could not be sold for fourpence three-farthings, or the proprietors would lose by the change. I have taken the most favourable instance; in the far larger number of cases where the paper employed is lighter in weight, the saving of the duty would be much less per number than our lowest coin, and therefore no reduction in the price of the paper could be made to the purchasers of single numbers; periodical subscribers might certainly be benefited in a direct manner by a slightly lower charge.

Having repeatedly heard what to my own mind appeared erroneous views expressed on this question of reduction of price, I have dwelt the longer on the point, because I believe a good cause is not advantaged by an unsound argument. It is not in the price of newspapers, but in their quality that I hope to see a great good result from the repeal of the duty.

The *Times** circulation in 1850 was nearly twelve millions (11,900,000). The duty on the paper amounted to upwards of 12,000*l*. Assuming the weight of each ream of 500 sheets to be 78lbs., the duty per ream would be rather more than 10*s*., and the number of reams about 24,000. But the case of the *Times* is entirely exceptional, its enormous circulation enabling it to employ the first talent, and its talent increasing the circulation. Its well written articles, even when the arguments excite a smile, are admired for the style of their composition.

Of ten other daily papers, the total issue was 8,920,140, equivalent to an average of 1,784 reams each, the duty upon which would amount to about 900*l*.

Of 48 weekly newspapers, not including those issuing less than 2,000 numbers weekly, the circulation in 1850 was 23,021,274, giving an average of 479,610 issued, and 960 reams of paper consumed by each; and assuming the weight per ream to be 50lbs. only, a saving to each newspaper by a repeal of the duty would be effected to the amount of 350*l*. per annum.

With these sums what a phalanx of literary talent could be engaged, introducing into the discussion of political and other subjects an amount of acumen, taste, scientific and general information, hitherto unknown in journalism. In London alone the amount immediately saved to the proprietors would be sufficient to engage 100 men of talent, at salaries equal to many of the professorships in our public institutions. The value of literary eminence to journals is evidenced by the high standing which certain French papers have taken from their connection with the names of Guizot, Thiers, Girardin, &c.

Newspapers, like other branches of business, can only continue to be worked as long as profitable to the proprietors; and the necessary expenses for paper, reporters, and foreign intelligence, being so heavy, it is a public duty, I conceive, to relieve them as much as possible from every incubus which prevents the best intellects from entering the lists in those discussions which must continually arise amongst a free people, thereby healthily influencing the public mind through the medium of the newspaper press; and I hope I have shown satisfactorily that by repealing the duty this can be done without loss to the proprietors, and at no increase of expense to the public. That we could engage the same persons at an enhanced cost to a newspaper is admitted; but the disastrous effects of an increased price on the circulation is sufficiently shown in the case of the *Daily News*, the circulation of which declined to a large extent on the price being raised from 2½*d*. and 3*d*. to 5*d*.

Publishers feel the pressure of the duty in several ways. On an average, the duty may be reckoned as one-fourth the value of the paper; thus the outlay for any given work is increased for paper only, by the operation of the duty, from 30*l*. to 40*l*., 300*l*. to 400*l*., 3000*l*. to 4000*l*. It is difficult to classify articles of such extensive range as books; it will be sufficient, however, for my purpose, to divide them into dear and cheap literature. In reference to the more expensive class of books, the sale of which is comparatively limited, every element of cost is a repressive element of publication; and in extensive works, the additional sum required to be advanced on account of the duty is very considerable.

The duty is eventually recovered when the books have all been sold, but it must be borne in mind that the duty is paid, not on each volume as sold, but is advanced by the publisher in a lump sum on the whole work, and that he receives it back piecemeal; he must therefore calculate upon receiving interest for this additional amount, thereby raising the price of books. It is stated, and I believe upon good grounds, that only one book in four of those published is profitable as a speculation; this circumstance compels publishers to be very cautious as to the works which they issue. It happens, therefore, that a great many books are published, valuable only in the author's esteem, but being issued at his expense and risk are not objectionable to the publisher, whilst a very large number of works, the result of long research and great ability, remain unpublished, although the very works most desirable to have printed, because publishers, as men of business, perceive that they will not be profitable, and the author may be too poor to incur the risk. In many such cases, the 25 per cent. in the price of the paper materially influences the decision of publication or non-publication. Publishers being the medium of communication between authors and the public, if the book will not pay as a matter of business to them, the public lose many opportunities of receiving much valuable information.

By removing the duty, we should, as far as the case will admit, persuade—if I may so term it—the mind of the business censors in favour of the class of authors. With regard to cheap literature, the repeal of the duty is still more important. The profit on each pamphlet, or number, must necessarily be the merest fraction, but on the whole impression may be sufficient to induce publishing capitalists to get up valuable books at a great cost, and issue them at a low rate.

A large sale depends upon low price. If the price were increased, the sale would be too small to induce the venture. Thus, supposing a useful serial to require an outlay of 5,000*l*.,—and if, after paying for writers, artists, paper, printing, binding, trade allowances, a profit of only 300*l.* should remain,—the publisher would not be disposed to enter upon the speculation; but if the amount of duty could be added to this sum, he would not only be induced to engage in the publication, but be enabled to employ greater skill in the illustrations, use better paper, supply more original matter, by having the means to pay authors, and issue the work on a much higher basis.

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* This is the number of stamps obtained, and includes Supplements, which are now issued almost daily. The circulation should probably be represented at about 7,000,000.

A case in point has occurred; and the argument obtains more force from the circumstance, that the larger the probable circulation, the more duty would be saved, and the publisher correspondingly influenced.

Not less important than the healthy action which such an improved tone in some of the journals and periodicals would have upon the minds of their readers, is the further effect which I anticipate, viz., the driving out of the field the vile trash which is now circulated to so large an extent amongst our youth.

Knowing that some of these have a circulation of 80,000, 100,000, and I understand in one case 200,000 weekly, no utterance of mine can sufficiently present to and press upon the intelligent mind of our country the necessity of doing everything possible to counteract this nauseous stuff poured forth from our presses.

The decent journals and serials cannot compete at present, the proprietors considering it *infra dig.* to visit the Insolvent Court; besides, the literary offal is supplied almost gratuitously. We burden the decent press, and then complain that the unburdened licentious press is supplanting it. Let us have a free press, and by the employment of such aid as I have mentioned, an able article for the adult, and an interesting column for the youth, the moral family journal and general literature will displace the privately read periodical—it will become offensive, and be rejected, from the result of better mental food.

Yours, &c., WAIMA.

## DUTIES ON PAPER, NEWS, ETC.

Newark, March 18th, 1853.

SIR,—Under the direction of the Committee of the Newark Mechanics' Institute, I have replied to the queries you sent relative to the duties on paper, &c., as affecting our Institution. I am very glad that the Society of Arts has commenced an inquiry on the subject, and have no doubt, if continued in, it will result in the repeal of those unjust and impolitic duties.

I conceive it to be the primary duty of a Government to advance in every possible way the education of the people: and whatever tax is imposed on articles directly or indirectly used for that purpose, becomes a bar to progress—a check to the advancement of education and science. Were the paper and stamp duty repealed, editors would be enabled to spend that sum on the enlargement and improvement of their publications. Superior talent might be engaged, and periodicals, instead of containing that trashy nonsense which we are obliged to purchase for our readers, would contain a higher order of intelligence, interest, and amusement.

With regard to books, I may mention that the low rate of subscription we are obliged to make to bring our Institution within the reach of the mechanics and artisans, precludes the possibility of our being able to purchase first-class works at original prices. We are obliged, therefore, to wait, and watch our opportunity of purchasing them second-hand; and then we frequently find so many applicants for the same works, that the trial to obtain them ends in disappointment. But if the fiscal restrictions were withdrawn from the production of these works, I fully believe that they would be published at a price within our means to obtain them.

The local news in our provincial papers seldom exceeds more than simple notices, accidents, and police reports. If a scientific lecture is given, or any other subject discussed worthy of publishing, the editor is obliged to send a gentleman specially for the purpose of reporting it, if a report be given at all. Consequently many things that would be really instructive, and of interest and benefit to readers, never appear; therefore are entirely lost, and give space for trashy and uninstructive matter. The reason of this is obvious. The unrighteous imposts on his newspaper before he can circulate it prevent the editor from affording to engage competent persons to collect local information and send reports, or write articles or paragraphs of a truly instructive character: and so men of business or young clerks are employed for a mere trifle, who have not the time or ability to serve the purpose suitably.

With regard to the advertisement duty, the charge this duty compels the proprietors to make for the insertion of advertisements prevents us from making known our lectures, entertainments, and other things connected with the Institution, through the best of means—the local papers. We have tried it, and always find that the cost is greater than the advantage.

Heartily wishing your Society success in their good work,

I remain, faithfully yours,
JAMES BUZZARD.

## MEASUREMENT OF TONNAGE.

Millwall, March 28th, 1853.

SIR,—I had no idea that the short note I addressed to you, and which appeared in No. 9 of the JOURNAL OF THE SOCIETY OF ARTS, would have given rise to the discussion that has since taken place, my only object being to correct the errors that appeared in a former number; neither should I again trespass upon your valuable space, but for the letter of your correspondent, H. M., No. XVI., page 190, wherein he says I made a statement in that letter about the new method of advancement, as laid down by the new law, which was "not quite correct either." Now this, Sir, is certainly not quite correct; for it was in my second letter (No. XI., page 126), I stated, that although the new law was not perfect, yet by taking the breadth and depth at different parts of the hold, it is an approximation to the truth; and I must confess, that as my only object was that nothing but the truth should appear in the Journal, I should have been much better pleased if your correspondent had stated in what particular part I was not correct. To illustrate the difference between the old and new law, I will mention the last new clipper that left London, the *Cairngorm*. This ship was built by Hall and Co., of Aberdeen, upon speculation, to beat everything afloat. Her tonnage, old measurement, is 1,250; and by the new, 938, or a quarter less: and her actual tonnage, about 1,000. Now I think, Sir, if the old law had been in existence, Mr. Hall might have kept his ship until she was only fit for fire-wood; but the new law allowed her to be sailed with less hands, and pay less dues, and consequently she was immediately bought, and I might almost say, fitted regardless of expense; for she was fitted with nearly every improvement, including, perhaps, the most ingenious application of the screw (not the propeller) to steering purposes ever seen; also Rigmaiden's lanyard plates-by means of which a man and boy can set up the whole of the lower rigging in about a couple of hours; Lenox's portable winches and patent blocks, which, to use the words of her spirited commander, Captain Robertson, you must have, if you wish to compete with the Americans; and last, though not least, Trotman's anchors, which, although placed No. 1 on the list of the Anchor Committee, unfortunately failed to sustain their character on the passage from Aberdeen to London. I trust, Sir, these remarks will not be considered out of place, one of the objects of the Society of Arts being to give publicity to new and useful inventions. I quite agree with Mr. Reveley, that the actual should be the register tonnage; also, that we must go to the ship-builder to get it. No arbitrary rule can give the true result; but I cannot agree that no rule or formula will suit the crack yacht and the heavy merchantman, for I think the builder's rule will, and that rule is actual measurement. The ship-builder measures his ship internally for capacity to carry admeasurement goods, and externally for displacement, and could tell, before the keel was laid on the blocks, how many tons of admeasurement goods, forty feet to the ton, she would carry, or how many tons of dead weight it would take to bring her down to a certain line. But I think, Sir, there would be some very serious objections to taking the displacement for the tonnage; one would be where to fix the load water line, for this must be arbitrary; another, the difference between a wood and an iron ship; whereas, if you take the internal capacity, which can be got at any time, ashore or afloat, you would know at once what the ship would carry. Besides, all cargoes are not taken by weight; and I should hardly think Mr. Reveley would seriously think of going back to the primitive plan of weighting our ships before we registered them. There is one other thing Mr. Reveley speaks of, namely, vessels that will not carry any tonnage at all. Now, Sir, I must candidly confess, that having been engaged among shipping about twenty years, I have never been so fortunate as to see the curiosity mentioned; and I do believe, if the saloons of some of our fleetest yachts were cleared out, and filled with oranges or figs, we should find they had a rather valuable cargo; in fact some of our clipper-schooners are built on the same lines as yachts.

Perhaps I may as well mention that the hook described by Mr. Clough, in No. XVII., page 202, was invented, and I think patented, by Mr. J. Shores, of Blackwall, about eleven years ago, and fitted to several of the West India Mail boats, the Trinity yacht Vestal, and many other ships, but have, somehow or the other, gone out of use lately.

I am, Sir,
Your obedient Servant,
William Roberts.

## SUGAR-CANE REFUSE.

Sir, — In reply to your inquiry on the subject of manufacturing paper from sugar-cane fibre, I beg to make the following remarks:—I have ascertained that two paper-makers have tried the article, and at the end of this note are copies of their replies to my questions. It will be observed that the opinions expressed are not very favourable; but as the experiments were of a comparatively limited extent, the reports must be judged accordingly. In estimating the probability of an article answering commercially as an available material to be made into paper, it is not only necessary to ascertain that it is capable of being pulped and will make paper, but also most important to become acquainted with:

1. The cost or value of the article in its native place.
2. Its abundance or scarcity.
3. The cost of carriage.
4. The loss it sustains in being converted into pulp.
5. The expense of chemicals and machinery necessary to effect this object.
6. The quality of the resulting paper, as compared with paper made from rags.

The influence of most of these points will be obvious to every one. It may not, however, be generally known that in the case of straw, the pulp produced is certainly not more than half the weight of the straw consumed; analogy infers that the same would be the case with sugar-cane fibre, hence the carriage would have to be paid on two tons of fibre for one ton of paper produced. Further, the cost of chemicals,—alkalies, chlorine, &c., is a very important feature in the manufacture of paper from straw, being vastly higher in amount than in the preparation of the same weight of rags, on account of the large quantity required,—the chemicals being, in fact, the preponderating elements in the cost of straw paper; and I have little hesitation in stating my opinion, that the same circumstances would attend the manufacture of paper from sugar-cane fibre.

An error is prevalent in reference to the use of substitutes for rags in the manufacture of paper. Fully admitting the desirableness of keeping the price of paper low, and to this end extending the supply of material for the manufacture; it must be borne in mind that herbaceous fibre, of whatever kind, in its native state, will always have to compete with an article in a half-prepared state, and which derives its whole value from the existence of the paper manufacture. Rags have undergone the operations necessary to convert them from fibre into fabric, thereby being half made into paper; and such preliminary operations have been paid for, if I may so speak, by the use to which the fabrics have been applied prior to their arrival into the possession of the paper-maker. Therefore it may be allowed me to suggest, that the field for new material should be searched in the direction of obtaining further supplies from substances which, having served one manufacture or purpose, are at present considered of no further use, and which having partly at least paid for their recovery from the fibrous state, would thus be available for a second manufacture, rather than in the direction of unmanufactured fibre, entailing upon the paper into which it is made the whole cost of reduction from fibre to paper. Jute appears to partake of this character, and has not received the attention it deserves. Any further information I can obtain, I shall be happy to communicate.

Yours very truly,
William Stones.

(COPY.)

"Bois Hill, Chesham, 12 March, 1853.

"Sir,—I have never succeeded to any extent in bleaching the sugar-cane fibre, and was obliged entirely to give it up, consequently cannot satisfy your inquiries respecting it.

"Yours, &c.,
(Signed) "John Elliot.
"Mr. Stones."

(COPY.)

"Tovil Mills, Maidstone, 25th March, 1853.

"Dear Sir,—My father has repeated to me the conversation he had with you, about producing pulp from sugar-cane.

"A good while ago, having a piece of the cane in my possession, I put it through a process similar to our Straw-process for paper, and found that it would pulp sufficient to make paper, but that the expenses of bleaching, &c., would be so enormous that unless the pulp was of a very superior nature, it would be commercially useless. This it was impossible to decide, from the small quantity operated upon

"I have a small quantity of 'Maga' left, and will bleach and pulp it for you, if you wish; and at any time shall be happy to assist you in any experiment.

Yours truly,
(Signed) "C. F. HOOK.
"Mr. W. Stones."

## PROCEEDINGS OF INSTITUTIONS.

BICESTER.—On Monday evening, the 21st ult., Mr. John Hamilton, of Aylesbury, delivered a Lecture to the members and friends of the Literary Institution, on the "Downfall of Jerusalem." The large Assembly-room was crowded, and for two hours the lecturer was listened to with the deepest attention. A vote of thanks to the lecturer was passed unanimously.

CARLISLE.—On Tuesday week, Mr. John Sewell, delivered a Lecture at the Mechanics' Institution; the subject being, "Recollections of the Great Exhibition." The Mayor occupied the chair. Mr. Sewell commenced with an allusion to the character of the Exhibtion; and having spoken of the impossibility of treating so vast a subject in a single lecture, went on at considerable length to trace the origin, history, and progress of that pepartment of art with which he was connected in business—painting and decoration; showing in what manner it was likely to be affected by the Great Exhibition. He brought forward a great variety of highly interesting statements and illustrations in regard to the state of the decorative art at various periods of the history of the world, and in a number of different countries. Towards the conclusion of his lecture he remarked, that France occupied a much higher position in the matter of paper-staining than this country. This he attributed not to the want of talent, enterprise, or capital on the part of our countrymen, but to the training and education of the French, and the pecuniary encouragement they gave to the productions of first-rate designs, and to the liberal expenditure which they make in bringing out a perfect article. He urged the importance of thoroughly training our youth in the Department of Practical Art—a department hitherto very much neglected among us. He hoped that ere long the doors of our schools of design would be thrown open to receive all without let or hindrance, and that by means of a good system of training we might soon leave all our deficiencies behind us.

CIRENCESTER.—The concluding lecture of the season at the Literary, Scientific and Mechanics' Institution, was given on Thursday evening, the 17th ult., by Mr. Joseph Simpson, Librarian of the Islington Literary and Scientific Society, "on the Life, Times, and Character of Henry VIII." The lecturer reviewed and delineated the circumstances connected with Henry's early life—the various events which resulted in the establishment of the Reformation, and portrayed the incidents attending his several marriages, the executions of his Queens, and the literary and learned men of his reign,—and concluded by giving a truthful summary of Henry's character. The manner in which the subject was treated, and the fact that the attention of the audience was sustained for nearly two hours, show that Mr. Simpson is not only thoroughly conversant with the matter, but has the power of conveying information in a pleasing form.

DUNMOW.—On the 21st ult., the Rev. C. L. Smith, President of this Institution, lectured on "the Polar Regions." After describing the successive aspects of summer and winter there, he showed that, notwithstanding the rigour of the climate, animal life was most abundantly developed. He briefly sketched the principal marine animals, from the whale down to those microscopic tribes of medusæ, which form the basis of animal life in Polar seas. He reviewed also the marine birds and the land mammalia. He next gave the reasons whence the existence of a North Polar ocean is concluded; and explained the formation of field-ice in that ocean, and the birth of ice-bergs along the glacier-coast of Greenland, mentioning the fact of the gradual sinking of the coast of West Greenland, as proved by the position of ancient Esquimaux huts. Pointing out next the course of the Polar current and of the Gulf stream, he showed how they encountered each other at the great bank of Newfoundland,—which was formed by their opposing action. Then alluding to the discoveries previous to Sir John Franklin's expedition, he mentioned the instructions given to that navigator, and detailed the various expeditions sent in search of him, with the results of their labours, and the grounds of future hope; dwelling at some length on the traces found at Beechey Island. His description of the graves of the seamen of the "Erebus" and "Terror", with their simple epitaphs, was well received. In conclusion, he called on his audience to be grateful for the numerous domestic comforts and luxuries which they derived from the great storehouse of the north; and urged them, while enjoying the blessings of their own temperate clime, not to forget Him to whom the patriarch Job so sublimely ascribed all the grand operations of nature, "Who saith to the snow, be thou on the earth; and likewise to the small rain, and the rain of His great strength." The lecture was illustrated by drawings executed by the president himself; and at the close of it, the young men requested him to leave these behind him, in order that they might study the subject further.

SOUTHAMPTON.—The Rev. F. Bugby, of Winchester, delivered a lecture on "Christopher Columbus," on Wednesday evening, to the members and friends of the Polytechnic Institution. The leading incidents in the eventful life of the great navigator—his unwavering faith in the realisation of his object—the difficulties and hardships, persecutions and sufferings, through which he passed, in the steady pursuit of the one great idea of his life, viz., the discovery of a western continent—and the calm resignation with which he submitted to the ingratitude of the Spanish monarch, whose kingdom he had enriched by his discoveries—were depicted by the reverend Lecturer in the most graphic style of descriptive narrative. The vast and important consequences to the whole civilized world, resulting from the discovery of America, whether looked at in a commercial aspect, or as opening up an immense western continent, whereon the refugee from political despotism or ecclesiastical tyranny could find a place of shelter, were pointed out; and the departure of the *Speedwell* and the *Mayflower*, from the port of Southampton, with the Pilgrim Fathers, within a century of Columbus's discoveries, was referred to as one of the earliest and most interesting fruits of his arduous labours. The lecture closed with some remarks on the prominent and guiding principles in the life and character of Columbus, and the lessons deducible therefrom.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

### ANSWERS TO CORRESPONDENTS.

*Press for the Blind.*—In answer to correspondent (No. 50) two communications have been received. The one gives the address of Mr. W. Hughes, at the Blind Asylum, Stretford-road, Manchester; the other says a letter addressed to Mr. G. (not Mr. W.) Hughes, Ramsgate, will no doubt find him.

*Writing Ink.*—In reply to your correspondent (No. 51) who asks what are the objections to the use of essential oils in the production of black writing inks, I would say; first, the cost of the oil; secondly, the difficulty of combining them without the aid of spirits; and, thirdly, that in large quantities the evaporation would be very great, and the oil being the lighter matter would be the first to be given off. Acids and salts have also been used for similar purposes, but, owing to their action on the colouring matter are not found to answer.

## MISCELLANEA.

COMMERCIAL LAW.—Mr. Leone Levi has just received from the Emperor of Austria, the Gold Medal for Literary and Scientific merit, for his work on the "Commercial Law of All Nations," a copy of which he recently presented to the Emperor, and which His Majesty has been graciously pleased to accept.

INJUNCTION UNDER COPYRIGHT OF DESIGNS ACT.—In the case of Hubert *v.* Paynter, which was tried before Vice-Chancellor Sir W. P. Wood, the Plaintiff (of the firm of John Woollams and Co., of London) sought to restrain Thomas Paynter, a paper-hanger and stainer, of Cheltenham, from printing imitations of a certain paper-hanging, the pattern or design of which was the registered property or copyright of plaintiff; and also that an account might be ordered to be taken of all the Defendant had fraudulently made of the said pattern. The Injunction was granted, with costs; and the blocks and stock were ordered to be given up to be destroyed.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

### *From Gazette, 25th March*, 1853.

*Dated 25th Feb.*

482. J. G. Taylor—Ornamental fastenings for dress.

*Dated 1st March.*

510. W. E. Newton—Improvements in capstans.

*Dated 3rd March.*

532. R. Barclay—Rotatory engines and transmitting aeriform bodies and fluids.

*Dated 9th March.*

595. S. Blackwell—Improvements in saddlery and harness.
596. F. Valtat and F. M. Rouillé—Construction of combs for looms.
597. J. Shuttleworth—Appendages to portable machines for thrashing, &c., corn.
599. G. Chambers—Means of gathering cinders and depositing ashes under fire-grates.
601. G. Collier—Manufacture of carpets, &c.
603. H. Ransford—Manufacture of starch.
605. G. Collier—Spinning, roving, &c.
606. F. W. Campin—Measuring steerage-way of vessels, &c.; applicable to ventilating ships and carriages. (A communication.)

*Dated 10th March.*

607. J. Walmsley—Machinery for block-printing.
608. J. Powis and J. S. James—Machinery for slotting, morticing, &c.
609. E. T. Bellhouse—Improvements in iron structures.
610. T. B. Dodgson—Improvements in roads, &c.
611. G. Collier—Machinery &c., for weaving.
612. Hon. W. E. Cochrane—Improvements in girths, &c., for saddles.
613. F. F. Dumarchey—Improvements in making roads, &c.
614. J. Stevens—Communication between guard and driver.
615. E. Myers—Preventing carriages running off the line.

*Dated 11th March.*

616. F. Preston—Manufacture of bobbins and spools.
615. J. Summers—Improvements in sails.
619. M. Poole—Apparatus for serving oysters, and other shell-fish. (A communication.)

*Dated 12th March.*

620. J. Gilby—Improvements in fire-arms.
621. W. Muir—Grinding edge-tools, &c.
622. P. A. Le C. de Fontainemoreau—Filtering liquids. (A communication.)
623. J. F. Heather—An equitable gas-weighing meter.
624. A. E. L. Bellford—Reaping machine. (A communication.)
626. T. Evans—Construction of steam-boilers.
627. G. Michiels—Obtaining oxygen.
628. T. Hunt—Construction of sights for fire-arms.
629. T. Rhodes—Manufacture of manure.
630. R. C. Witty—Manufacture of gas.
631. J. Murdoch—Portable voltaic batteries. (A communication.)

*Dated 14th March.*

632. W. B. and J. Quinton—Improvements in manufacture of measuring-rules.
634. W. E. Staite—Improvements in producing and applying currents of electricity, &c.
636. B. A. and H. M. Burton—Manufacture of casks, &c., and machinery for sauce.
638. J. H. Johnson—Improvements in dyeing. (A communication.)
640. W. Stevenson—Treatment, &c., of textile materials.

*Dated 15th March.*

642. W. Morgan—Portable double-action folding chair.
644. P. S. L'Hernault and J. Richards—Means of unhooking horses and stopping vehicles.
646. J. Maudslay—Screw-propeller.
648. E. Sabel—Looking-glasses.

*Dated 16th March.*

652. W. Malins—Atmospheric propulsion on railways.
654. S. Colt—Heating and annealing metals.

*Dated 17th March.*

658. J. T. Ashenhurst—Pianofortes.
660. G. Johnson, M.D.—Looms.

APPLICATION WITH COMPLETE SPECIFICATION FILED.

650. J. V. Hielaker—Improved eccentric-engine, applicable to the purposes of general navigation.—16th March, 1853.

### WEEKLY LIST OF PATENTS SEALED.

*Sealed 28th March*, 1853.

38. The Hon. William Erskine Cochrane, of Albany-street, Regent's-park—Improvements in unloading coals from ships or vessels.
71. John Ambrose Coffey, of Providence-row, Finsbury—Improvements in apparatus for performing various chemical and pharmaceutical operations, hereby denominated, "Coffey's Improved Patent Esculapian Apparatus," parts whereof are applicable to steam boilers, steam and liquid gauges, stills, and syphons.
175. Michael Cavanagh, of Notting-hill—Improvements in mortice-lock spindles.
177. William Simpson and John Shelton Isaac, of Maidstone—Invention of an improved composition to be used principally as a substitute for wood and other materials, where strength and lightness are required in the manufacture of various articles.
217. Michael Angelo Garvey, of 10, Jeffreys-terrace, Kentish-town—Invention for more effectually dissipating the shock of collision in railway trains, reducing the surfaces exposed to atmospheric resistance, and diminishing oscillation by making portions of the whole of each carriage elastic in every direction, and increasing the power of the carriage to resist severe pressure by means of metallic tubes in its longitudinal angles.
236. Robert Brown, of Salford, Lancashire—Invention of an improved taking-up motion applicable to looms and other similar purposes.
257. Alexis Delemer, of Radcliffe, Lancashire—Improvements in machinery or apparatus for manufacturing piled fabrics.
298. Edward Joseph Hughes, of Manchester—Invention of an improved method of purifying and concentrating the colouring matter of madder, munjeet, and spent madder.
311. Auguste Edouard Bellford, of 16, Castle-street, Holborn—Improvements in apparatus for manufacturing soda-water and other aërated liquids.

562. Arnold James Cooley, of Parliament-street, Westminster —Improvements in treating woven and felted fabrics, to render the same repellent to water and damp.
919. James Barlow, of King William-street—Improvements in stands or supports for casks, barrels, and other like vessels.
1170. George Ferguson Wilson, of Belmont, Vauxhall — Improvements in treating certain fatty bodies.
22. Gustave Eugene Michel Gerard, of 12, Rue Hauteville, Paris, and 4, South-street, Finsbury—Improvements in manufacturing and treating caoutchouc.
77. John M'Dowall, of Walkinshaw Foundry, Johnstone, N.B. — Improvements in cutting or reducing wood and other substances.
154. William Edward Newton, of 66, Chancery-lane—Improvements applicable to clocks, and other time-keepers, for the purpose of indicating not only the time of the day, but the day of the week, the month, and the year, which invention he intends to denominate, "Hawes's Calendar Clock, or Timepiece." (A communication.)
195. Isaac Davis, of 119, High Holborn—Improvements in optical and mathematical instruments.
242. George Twigg and Arthur Lucas Silvester, of Birmingham — Improvements in apparatus for cutting and affixing stamps and labels. (Partly a communication.)
250. John Wilkinson, jun., of West Bromwich—Improvements in machinery for cutting or shearing iron and other metals.
254. Thomas Lightfoot, of Accrington—Improvements in glazes for pottery and other similar materials.
276. Alfred Vincent Newton, of 66, Chancery-lane—Improvements in block-printing machinery. (A communication.)

*Sealed 30th March.*

7. John Henry Gardner, of Poppin's-court—Improvements in toilet-tables.
42. Oswald Dodd Hedley, of Newcastle-upon-Tyne — Improvements in getting coal and other minerals.
44. James Hodgson, of Liverpool — Improvements in machinery for draining land.
52. Walter M'Lellan, of Glasgow — Improvements in the manufacture of rivets, and in working in metal.
63. John Fordham Stamford, of Stangate-street, Dover—Improvements in machinery or apparatus for manufacturing bricks, tiles, and similar building materials, which is hereby denominated "The Complete Brickmaker."
66. George Holmes, of 31, Great Queen-street, Lincoln's-inn-fields — Improvements in the manufacture and construction of coats, capes, and other upper garments of personal attire.
68. George Ellins, of Droitwich, Worcestershire—Invention of an improved method or apparatus for preparing flax straw for dressing and cleaning.
69. William Moore and William Harris, of Birmingham—Improvements in repeating pistols and rifles.
72. Edward Wilkins, of 60, Queen's-row, Walworth—Improvements in the distribution and application of water and other liquid manure to promote vegetation.
91. William Walker, of Liverpool—Improvements in wheels for railway-carriages, and in the mode or modes of manufacturing the same.
92. Thomas Lawes, of 32, City-road—Improvements in the manufacture of agricultural implements, or an improved agricultural implement.
93. Thomas Lawes, of 32, City-road—Invention of an improved quilt or coverlid.
94. Thomas Lawes, of 32, City-road—Improvements in generating steam.
104. Martyn John Roberts, of Gerrard's-cross, Bucks—Improvements in the manufacture of oxides of zinc and tin.
110. John Wright and Edwin Sturge, of Cornwall-road, Lambeth—Improvements in machinery for the manufacture of envelopes.
111. John Remington, of Sloane-street, Chelsea, and Zephaniah Deacon Berry, of Victoria-road, Pimlico—Improvements in gas-meters, or apparatus for measuring gas or other elastic fluids.
139. William Lewis, of Piccadilly — Improvements in compounding medicines in the form of pills.
142. Henry Bernoulli Barlow, of Manchester—Improvements in the manufacture of cylinders for carding cotton and other fibrous substances.
143. John Laurence Gardner, of Whitecross-street — Improvements in bottles and other vessels for holding liquids.
144. William Seaton, of Coleshill-street, Pimlico—Improvements in the construction of iron vessels, and in sheathing or covering the same.
147. Edwin Whele, of Shiffnall, Salop — Improvements in apparatus for burning candles, and in horological apparatus, attached thereto.
148. Edward William Kemble Turner, of Praed-street, Paddington—Improvements in machinery for sweeping or cleaning chimneys, also for more effectually extinguishing them when on fire.
156. Joseph Brown, of Leadenhall-street—Improvements in beds, sofas, chairs, and other articles of furniture, to render them more suitable for travelling and other purposes.
165. Moses Poole, of Serle-street—Improvements in constructing bridges, viaducts, and such like structures.
170. Edward Allport, of Aldermanbury—Improvements in the manufacture of buttons by making them with elastic shanks.
171. William James Lewis, of London—Invention of a slideless, stadia sight, applicable to rifles and other firearms.
173. Theophilus Kedwood, of Montague-street, Russell-square —Improvements in the manufacture of gelatine.
176. Peter Hyde Astley, of Stratford, Essex, and John Figgins Stephens, of De Beauvoir-square, Kingsland—Invention of an improved construction for floating vessels, having for its object the rendering them safe means of transit.
180. John Slack, of Manchester—Improvements in the manufacture of textile fabrics.
222. Aristide Balthazard Berard, of Paris—Improvements in the construction of jetties, breakwaters, and docks, and other hydraulic constructions.
225. Joseph Apsey, of Blackfriars—Improvements in shipbuilding and in machinery for propelling.
242. William Mackenzie George Blair, of Glasgow—Improvements in the arrangement and construction of graduated scales for measuring instruments.
282. John Blair, of Ducie-bridge Mill, Manchester—Improvements in the manufacture of waddings and in machinery for making the same.
292. Samuel Rainbird, of Norwich—Improvements in grappling and raising sunken vessels and other submerged bodies, and in apparatus for that purpose.
326. Charles William Siemens, of Adelphi-terrace—Improvements in engines to be worked by steam and other fluids.
371. William M'Farlane, of Glasgow—Improvements in water-closets.
383. Donald Grant, of Luton-place, Greenwich — Improvements in the means of applying the heat derived from the combustion of gas.
408. William James Matthias and Thomas Bailey, of Clerkenwell—Improvements in clocks and watches.
459. Charles Wightman Harrison and Joseph John Harrison, of Richmond, Surrey—Improvements in protecting insulated telegraphic wires.
472. Joseph Rose, of Aldersgate-street—Improvements in locks
490. Stanislaus Hoga, of Nassau-street—Improvements in separating gold from the ore.
545. Charles Benjamin Normand, of Havre, France—Improvements in machinery for sawing wood.
1064. Jean Francois Isidore Caplin, of Strawberry-hill, near Manchester—Improvements in apparatus for preventing or curing a stooping of the head or body.
1153. John Hinks and George Wells, of Birmingham—Invention of a new or improved pen-holder.
51. Hezekiah Marshall, of Canterbury—Improvements in the transmission and emission of air and sound.
79. John Hick, of Bolton-le-Moors—Improvements in the method of lubricating revolving shafts and their bearings or pedestals.
152. George Thornton, of Grange, Gargrave, Yorkshire—Improvements in propelling vessels.
156. Matthew Andrew, of Hyde, Chester—Improvements in fastenings for windows.
273. John Cockerell and Thomas Barnett, of Kingston-upon-Hull—Improvements in the construction and use of coffee-roasters.
275. James Carter, of Oldham—Invention of an improved rotary-engine.
299. Alfred Tylor, of Warwick-lane, Newgate-street, and Henry George Frasi, of 84, Herbert-street, New North-road—Improvements in water-closets.
304. Frederick John Jones, of Addle-street—Improvements in fastenings for bands, belts, straps, and other similar articles. (A communication.)

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| March 24 | 3435 | Compound Carriage-step | John Josias Catterson | 9, Cloudesley-ter., Islington. |
| „ 30 | 3436 | Extending Table | De Jean Louis Benoit Vandenbosch | Montague-aux-Herbes Potagères a Bruxelles. |
| „ „ | 3437 | Duck & Wilson's Improved High-pressure Cocks | W. Duck & W. Wilson | 49 & 83, London-road, Southwark, London. |

# SOCIETY OF ARTS.

**FRIDAY, APRIL 8th, 1853.**

## FIFTEENTH ORDINARY MEETING,

*Wednesday, April 6th,* 1853.

The Fifteenth Ordinary Meeting of the Society was held on Wednesday, the 6th inst., Robert Stephenson, Esq., M.P., Vice-President, in the chair.

The following were elected Members:

Bladon, Thomas, Uttoxeter.
Brown, William, M.P., Liverpool.
Courtauld, George, Braintree, Essex, and 2, Carey-lane, Goldsmiths' Hall.
Dickinson, Joseph, M.D., Great George-street, Liverpool.
Eykyn, Roger, 22, Change-alley, and Streatham.
Eykyn, Thomas, 22, Change-alley, and Bayswater.
Houron, John Saul, Collegiate Institution, Liverpool.
Solly, Richard, Sheffield.

The following Institutions have been taken into Union since the last meeting:

Bicester, Literary Institution and Mutual Improvement Society.
Wirksworth, Mechanics' Institution.

A paper was read on "Recent Improvements in the Preparation and Treatment of Flax," by John Wilson, F.R.S.E., &c.

The object of the present paper having reference rather to the technical than to the original history of Flax, I will merely describe the plant so far as is necessary for my purpose, and then proceed to discuss its economic application. It is generally seen in a cultivated state growing to the height of two to two and a half feet, flowering towards the end, and arriving at maturity towards the end of the following month. It is then harvested, and consists of a thin reedy stem, surmounted by a branching head, carrying at its extremities certain small capsules or seed bolls. These are removed by means of rollers, and the stem, or straw, from which the fibre is obtained, remains. This straw consists of three parts—the centre, usually termed "shove," or "buon;" the fibre, which surrounds it; and the epidermis, or skin, which forms the exterior. Now the object desired is to separate this fibre from the other portions; and many different processes have been devised for effecting it. These may be all classed under two heads—those dependent upon mechanical principles, and those dependent upon chemical principles. In the former the operations are conducted in a dry state; in the latter, in a wet state. The most important mechanical processes are those invented by Lee, in 1812, which was favoured by a special Act of Parliament, and supported by a grant from the Irish Linen Board; by Hill and Bundy, in 1817; and more recently by Doulan, Davy, and others. The advantages of this principle are seen in the expeditious manner in which it is effected; when the crop is of a very inferior character, so as not to pay for the expense of steeping, &c., in districts where steeping is effected with difficulty, and in cases where coarse yarns only are required. On the other hand, it would appear that, owing to a large portion of the azotised substance of the plant remaining attached to the fibre, it is not suited for fine fabrics; the elements of fermentation exist, ready to be called into action by moisture, &c.

The chemical processes are due either to the action of fermentation, which destroys the portion of the plant that binds the several parts together, and thus sets free the fibre,—to the action of heated water or steam, which simply dissolves it out,—or to the action of chemical agents, such as alkaline solutions, which effect the same end. By the fermenting process a portion of the plant is destroyed, the products of decomposition manifesting themselves in the shape of noxious and offensive gases. By the steam or hot-water processes the matter dissolved out is rendered serviceable as a feeding substance, and no annoyance is occasioned. The common practice is either to steep the flax in pools or in slowly running streams—in both, the mode of proceeding is the same; in the pool, owing probably to the increased temperature, the time required is from seven to fourteen days; in the stream, from fourteen to twenty-one days: in both cases the weather materially influencing the operation. In some districts the practice of dew-retting still exists, and this is always very irregular in its effects; in dry seasons it frequently fails. In 1846, Schenck's process of hot-water steeping was patented, and in 1848, a rettery on a considerable scale was established in Mayo. Upwards of twenty are now at work in different provinces in Ireland, besides several in this country. The principle of fermentation is the same in this as in the old process, but is now placed under the control of the operator, who regulates the action of the steep according to the quality of the flax, or the article he wishes to produce. A great saving in time is effected—from seventy-two to ninety-six hours only being required instead of from two to three weeks, and a more regular and certain fibre is obtained.

In some experiments instituted by the Irish Flax Improvement Society into the merits of the two methods of steeping, it resulted that in *increased yield*, Schenck's gave an advantage of twenty per cent.; that in quality, two samples of Schenck's spun respectively to seventy and one hundred and one lea yarns, while two samples of the same flax, *cold* steeped, only spun to sixty and ninety-six leas. The use of hot water for accelerating the fermenting process has been known for a long while past, and is mentioned in the Report of Class IV., by Professor Solly, the indefatigable Secretary to this Society. I must also refer you to the Report for the very interesting particulars connected with the application of alkaline solutions as a substitute for the tedious and noxious process of fermentation in the preparation of flax. You will there see that in 1747 the principle was made known by Lilljikreuses and Palmquist; and that in 1775, Lady Moira actually carried into practice the same process which has recently been brought before the public by Chevalier Claussen; while Gay Lussac, Berthollet, and other chemists, have added their testimony to the solvent powers both of alkaline and acid solutions. In the use of chemical agents a considerable expense is incurred, the matter dissolved out is wasted, and a chance of injury to the fibre exists. These objections are entirely met by Watts's process, which was patented last year, and is now in active operation at Belfast, and in progress in several other localities. In this steam is the agent employed. The straw is confined in a suitable chest or chamber, steam at a certain pressure is blown in, and kept in action during from ten to twelve hours; this is condensed by a simple arrangement, and, trickling down through the mass, carries with it the soluble matter of flax, which is drawn off at the end of the operation, and is found to be well adapted for feeding purposes, having a value equal to distillers' wash.

The subsequent operations of drying, scutching, &c., are conducted in the usual manner. The importance of this new process was immediately recognised, and a Committee of Investigation appointed by the Flax Society to institute "a careful and extensive series of experiments, with a view to compare it both in a practical and financial point of view, with the modes of hot and cold steeping generally practised." The Committee made their Report on the 3rd of November last, from which it appears that the whole operation, from the straw to the dressed fibre, was completed in thirty-six hours;—that the cost of all the operations, not including the drying, for reasons stated, appeared to be under 10*l*. per ton of cleaned fibre for labour, exclusive of general expenses;—that 10½ cwt. of straw, after being steamed for eleven hours, was reduced to 7 cwt. 0 qr. 11 lbs., which on being scutched yielded 187 lbs. of flax, 12 lbs. 6½ ozs. of fine scutching tow, and 35 lbs. 3 ozs. of coarse tow. The samples were valued at 56*l*. to 70*l*. per ton. The yield on the heckles was good, and the yarns were pronounced equal in all respects to what is generally spun from flax of the finer qualities.

The Report throughout was very satisfactory. Here, then, we have a process which presents the following advantages over the ordinary methods:—1. Great saving in time; 2. Economy of fibre; 3. Avoidance of any nuisance, and economical application of waste products. No sooner had the spinners reported favourably on Watts's fibre, than another process was patented by Buchanan, which appears to be an improved application of the same principle as Watts's; as the solvent power is clearly not due to the steam, but to the hot water occasioned by its condensation. In this, the steeping is effected by repeated immersions in a bath of heated water, arrangements being made by which the temperature is never allowed to exceed a certain point. The process is quite automatic, and the mechanical means by which it is effected are very simple and very inexpensive. The flax is placed in an open vessel, having a false bottom; a boiler generates the steam required; and between these two is placed a suitable vessel, having the same capacity as the steep-vessel, and communicating by means of pipes both with that and the boiler. This centre vessel is filled with water, and steam is blown in from the boiler. When condensation no longer takes place, the hot water is driven over into the vessel in which the flax is laid, and completely immerses it. An overflow-pipe then acts upon a valve, which immediately cuts off the supply of steam from the boiler, and at the same time turns on a spurge of cold water into the centre vessel (or condenser); the steam is at once condensed, and the liquor drawn back from the steep-vessel, into which it had been previously forced. This operation may be repeated as often as desired; as, directly the condenser is filled, the cold water is cut off, and the steam again turned on. So far as experiments on a small scale have gone, it has been found that by ten immersions all the colouring matter of the flax has been removed—these in practice on a commercial scale would not occupy longer than three hours. This, however, has yet to be seen: works on an extensive scale are now in progress in Scotland for carrying out the process. In this, the same advantages are obtained as in Watts's—great economy of time, and economy of products.

Another great improvement is claimed by Buchanan; his method of drying the steeped flax preparatory to scutching. This is usually a tedious and expensive part of the operation, the fibre always sustaining some injury from the necessary handling. He proposes to effect the desiccation in the vat in which the flax is steeped, by means of *dry* warm air, which is driven through it in large quantities. This air is obtained in the required state by passing it through *porous* earthenware pipes, fixed in the lower part of the chimney shaft. The Patentee's experiments induce him to believe that by his process the entire operation of converting the straw into dressed fibre may pe effected in the working day of twelve hours, and that in all respects his products will be equally satisfactory with those obtained by Watts's process; while at the same time a great saving of manual labour, and consequent expenditure will be effected.

The statistics of flax show the important place it occupies in the economics of this country. Our requirements still considerably overbalance our powers of production, our average imports being 70,000 tons of flax, 650,000 quarters of seed for crushing and sowing, and 70,000 tons of oil-cake,—approximating in value five millions sterling; a large sum to be given annually to foreign countries for an article for the production of which our own is so peculiarly suited.

The CHAIRMAN moved a vote of thanks to Professor Wilson, for the information he had afforded on a subject which commended itself to the attention and interest of every one. He trusted that an impetus would be given to the growth of flax, especially in Ireland, so that by mutual dependence in commerce, the bonds between that country and Great Britain might be made stronger than they had hitherto been.

Mr. DAVY rose to second the vote of thanks, in which he personally, most cordially joined. As he saw on the table a case of specimens which were prepared by himself, and presented to the Commissioners of the Great Exhibition, and as his name had been mentioned in the paper just read, he wished to add one or two remarks. His name had been mentioned in connection with the dry process of preparing flax, and as the inventor of some machinery for separating the fibrous from the ligneous portions. He wished to say that this machinery had never been brought before the public. He had merely referred to it in a discussion which had been brought about by

Chevalier Claussen. One reason why he had not brought it before the public as yet, was the great discouragement to the culture of Flax, which had been occasioned by the pretensions of that gentleman, who had created hopes that had never been realized. In the South of Ireland, upwards of 3,000 acres had been grown on the strength of that project, and the crop had been left unpurchased, and without any means of steeping or preparing for the market. The public having been misled in that matter, he was unwilling to bring out his invention until the bad effects of Chevalier Claussen's scheme had been dissipated from the public mind. By his plan the Flax might be worked and spun with cotton machinery; but he had no wish to see Flax reduced to this position. Mr. Davy then proceeded to answer some of Professor Wilson's objections to the dry process, deprecating the idea that it merely involved the mechanical treatment of the fibre. In reference to Schenck's process—about two years ago, a gentleman, whom he knew, went to Belfast, and purchased works to carry out that plan, and he (Mr. Davy) had an opportunity of visiting those works; from what he saw he did not form a very exalted opinion of the results. There was certainly an advantage in point of time over the ordinary process of steeping, but on examining the flax after it was taken out, he found it very objectionable, on account of the decomposition, and also from its offensive smell. In regard to the success of the plan, he might add, that he had just learned from Mr. Cobden, M.P., who was a relative of the gentleman referred to, that he had entirely abandoned the works, and given the matter up as an unsuccessful project. He then referred to a defect in the samples produced by Professor Wilson, as the result of Buchanan's process,—the colour was bad; it was the same in all flax steeped in a state of straw; and he thought it arose from the fact, that it was dried before the colouring matter was thoroughly removed from the fibre, so that in point of fact the fibre was dyed.

Mr. **Varley** made some observations on the revelations of the microscope in regard to flax, and stated, that the superior strength of flax arose from the fact that its fibre was solid, not tubular. In the first stages of its growth it was, like most other fibres, tubular; but as it ripened, it gradually filled up, and became solid. Flax fibres were very fine, were firmly cemented together, and in all strong fabrics several of these fibres were suffered to remain thus united; but in the finest materials the flax was reduced to its ultimate fibre.

It was announced that at the next Meeting, on April 13th, a paper would be read by Mr. Robert Blackwood, of Kilmarnock, "On Explosions in Mines and Collieries, and the Means of Preventing them."

## PHOTOGRAPHIC INSTRUMENTS.

It will be remembered by the Members of the Society, that an Exhibition of Photography was opened in the Society's Rooms at Christmas last, by which considerable interest was excited in favour of the Art, and it also gave rise to much inquiry relative to the processes and instruments employed in producing the pictures. The Council have, with a view to affording the information then sought, caused a collection of cameras and instruments to be made, which is now opened for the inspection of any of the Members or their friends who may be desirous of examining them. The cameras exhibit several new principles of construction, intended to increase their general efficiency, portability, and cheapness. Plans for the construction of printing-frames, stereoscopes &c., are included in the collection.

## COLONIAL POSTAGE.

The following are extracts from letters and documents recently received by the Postage Association:

A Petition, of which the following is a copy, has just arrived from Trinidad. It is signed by 112 of the leading merchants and planters in the Colony:

To the Hon. the House of Commons, etc.

The humble Petition of the undersigned inhabitants of Trinidad

Showeth,—

That your Petitioners have deeply at heart the necessity of fostering in any way the ties between this Colony and the mother country.

That cheap postal communication with England, as the centre of the commercial world, would be one of the surest means of binding us together by feelings of mutual interest.

Your Petitioners therefore pray your Honourable House to consider whether it would not be advisable, in a national point of view, at once to extend the system of pre-paid Penny Postage to this and any other portion of the Empire.

Two Petitions have been received from Tobago; one addressed to the House of Lords, the other to the Commons:

The Petition of the undersigned inhabitants of the Island of Tobago

Humbly Showeth,—

That your Petitioners have deeply at heart the maintenance and extension of friendly relations between the different nations of the world, and the polity of fostering in every way the ties between Great Britain and its Colonies.

That cheap communication with Great Britain, as the centre of the commercial world, would be one of the surest means of binding together its Colonial Empire by ties of mutual interest.

That the large and increasing emigration of the population of the United Kingdom renders this time particularly appropriate for considering the subject.

Your Petitioners therefore pray your Honourable House to provide the means of improving the Foreign and Colonial Postal arrangements, and especially to consider whether it would not be advantageous, in a national point of view, at once to extend the system of uniform pre-paid Penny Postage to the whole of the Colonies and other dependencies of the British Empire.

The Petitions are signed by the Speaker of the General Assembly, by the Solicitor-General and the Deputy Colonial Secretary, by several members of the Assembly, and by a large number of proprietors, planters, and merchants.

Resolutions passed at a meeting of the Chamber of Commerce, of the city of St. John, New Brunswick, on the 26th February, 1853:

That in the opinion of the Chamber of Commerce the extension to this Colony of a cheap and uniform rate of postage, as at present established in the United Kingdom, would be of vast importance to the trade and commerce of this province, and to the well-being and intellectual advancement of its increasing population.

And further resolved,

That the Petition to the Imperial Parliament, praying for the establishment of a uniform system of Colonial and International Postage submitted for consideration, being in accordance with the views and opinions of the Chamber of Commerce of the city of Saint John, ordered that the Chairman for the time being, and the Secretary affix their signatures to the same on behalf of the Chamber.

*From Matthew H. Richey, Esq., Halifax, Nova Scotia.*

When the postage Petition is ready for transmission to England I shall have it placed in the hands of His Excellency the Lieutenant Governor. It is now signed by all the Members of the Executive and Legislative Councils of this province, and of the House of Assembly, by the Bishop and Chief Justice, and by the most influential Merchants of this city. Some time since I communicated to the Secretary of the Province the fact of my appointment to act as Local Secretary here, and received from him an assurance of co-operation. I have sent in a Petition to the Legislative Council and to the House of Assembly, drawing their attention to the Association, and praying them to aid it by such means as they may devise. This petition, I am informed, was well received.

## TRADE RETURNS OF IMPORTS AND EXPORTS.

Every one who has occasion to consult the ponderous volumes in which the yearly Returns of the Board of Trade are published, must have felt how difficult it is to remember the high numbers and large sums, which exhibit the yearly fluctuations of the different branches of our foreign and Colonial commerce; or to attempt to form any definite estimate of the relative value and importance of each special trade. This fact has recently been well pointed out by Mr. Laurie, who has shown that if in addition to the Tables of imports and exports now printed additional columns were added, showing the relation which each item bears to the whole trade, their value would be very greatly increased. For example; when it is stated that the declared value of British produce and manufactures exported to our Colonies in South Africa, in 1851, amounted to seven hundred and fifty-two thousand three hundred and ninety-three pounds sterling,—the whole value of our exports that year being seventy-four millions four hundred and forty-eight thousand seven hundred and twenty-two pounds—it is difficult at once to see the relative importance of the South African export trade; if, however, numbers are added, showing that this particular trade constitutes one per cent. of the whole export trade of the country, its real value is much more apparent. The use of thus reducing trade returns to a decimal system is more particularly evident when we endeavour to compare together the imports or exports of one year with those of another; we then see the value of having a fixed standard of unity, namely, the whole actual commerce of the country, all special returns being reduced to per centages on that standard. It is plain that merely to state the number of tons of any article imported from a particular country does not nearly so well show its value as an article of trade, as it does if we show the ratio which that single import bears to the whole trade of the country; and that we can best judge of the increase or decrease of value in any import, by comparing together the ratio which it bears to the whole trade of one year with that of another. It sometimes happens that the importation of a particular article seems to be increasing, when its real importance is in fact rather on the decrease; because, though it is true that the absolute quantity of it has somewhat increased, yet that increase has been less than the increased import of many other articles employed for similar purposes,—in fact, less than the general increase of that particular branch of trade. The following Table, drawn up by Mr. Laurie, will serve to illustrate the mode in which the present Government Returns may at once be simplified, and rendered more practically useful than they are at present:

BOARD OF TRADE RETURN OF EXPORTS FOR 1851.

| | Countries to which exported. | Declared value. | Value per cent., being the proportion which the different countries bear to each other per every £100 exported. | | | |
|---|---|---|---|---|---|---|
| | | £ | Dec. £ | £ | s. | d. |
| 1. | United States | 14,362,976 | 19·292 | 19 | 5 | 10 |
| 2. | British India | 7,806,596 | 10·486 | 10 | 9 | 8¾ |
| 3. | Hanseatic Towns | 6,920,078 | 9·295 | 9 | 5 | 10¾ |
| 4. | British North America | 3,813,707 | 5·123 | 5 | 2 | 5½ |
| 5. | Holland | 3,542,673 | 4·759 | 4 | 15 | 2¼ |
| 6. | Brazil | 3,518,684 | 4·726 | 4 | 14 | 6¼ |
| 7. | Australia | 2,807,356 | 3·771 | 3 | 15 | 5 |
| 8. | Turkey, &c. | 2,221,359 | 2·984 | 2 | 19 | 8¼ |
| 9. | British West Indies | 2,201,032 | 2·956 | 2 | 19 | 1½ |
| 10. | China | 2,161,268 | 2·903 | 2 | 18 | 0¾ |
| 11. | France | 2,028,463 | 2·725 | 2 | 14 | 6 |
| 12. | Foreign West Indies | 1,850,210 | 2·485 | 2 | 9 | 8½ |
| 13. | Russia | 1,289,704 | 1·732 | 1 | 14 | 7¾ |
| 14. | Naples and Sicily | 1,266,211 | 1·701 | 1 | 14 | 0¼ |
| 15. | Peru | 1,208,253 | 1·623 | 1 | 12 | 5½ |
| 16. | Chili | 1,181,837 | 1·587 | 1 | 11 | 9 |
| 17. | Portugal, &c. | 1,149,932 | 1·544 | 1 | 10 | 10½ |
| 18. | Spain, &c. | 1,065,320 | 1·431 | 1 | 8 | 7½ |
| 19. | Belgium | 984,501 | 1·322 | 1 | 6 | 5¼ |
| 20. | Egypt | 968,729 | 1·301 | 1 | 6 | 0¼ |
| 21. | Islands in the Indian Seas | 962,598 | 1·293 | 1 | 5 | 10¼ |
| 22. | Tuscany | 896,131 | 1·167 | 1 | 3 | 4 |
| 23. | Austrian Italy | 812,942 | 1·092 | 1 | 1 | 10 |
| 24. | British South Africa | 752,393 | 1·011 | 1 | 0 | 2½ |
| 25. | Sardinia | 706,108 | ·948 | 0 | 18 | 11½ |
| 26. | West Coast of Africa | 658,934 | ·885 | 0 | 17 | 8½ |
| 27. | Channel Islands | 613,724 | ·824 | 0 | 16 | 5¾ |
| 28. | Mexico | 577,901 | ·776 | 0 | 15 | 6¼ |
| 29. | Prussia | 503,531 | ·676 | 0 | 13 | 6¼ |
| 30. | Gibraltar | 481,286 | ·646 | 0 | 12 | 11 |
| 31. | Buenos Ayres | 458,329 | ·616 | 0 | 12 | 3¾ |
| 32. | Sweden and Norway | 447,133 | ·601 | 0 | 12 | 0¼ |
| 33. | Denmark | 445,500 | ·598 | 0 | 11 | 11½ |
| 34. | Syria and Palestine | 359,871 | ·485 | 0 | 9 | 8½ |
| 35. | Venezuela | 349,701 | ·470 | 0 | 9 | 4¾ |
| 36. | New Granada | 319,889 | ·430 | 0 | 8 | 7¼ |
| 37. | Central America | 319,814 | ·430 | 0 | 8 | 7¼ |
| 38. | Malta | 301,443 | ·405 | 0 | 8 | 1¼ |
| 39. | Papal territories | 266,633 | ·358 | 0 | 7 | 2 |
| 40. | Hayti | 239,146 | ·321 | 0 | 6 | 5 |
| 41. | Mauritius | 232,955 | ·313 | 0 | 6 | 3 |
| 42. | Honduras | 232,633 | ·312 | 0 | 6 | 3 |
| 43. | Hanover | 227,288 | ·305 | 0 | 6 | 1¼ |
| 44. | Ionian Islands | 223,096 | ·300 | 0 | 6 | 0 |
| 45. | Greece | 220,592 | ·296 | 0 | 5 | 11 |
| 46. | Uruguay | 218,078 | ·293 | 0 | 5 | 10¼ |
| 47. | South Sea Islands | 60,795 | ·082 | 0 | 1 | 7¾ |
| 48. | Ecuador | 54,099 | ·073 | 0 | 1 | 5½ |
| 49. | Morocco | 40,783 | ·055 | 0 | 1 | 1¼ |
| 50. | Mecklenberg Schwaren | 33,153 | ·045 | 0 | 0 | 10¾ |
| 51. | Ascension and St. Helena | 30,555 | ·041 | 0 | 0 | 9¾ |
| 52. | Bolivia | 20,100 | ·027 | 0 | 0 | 6½ |
| 53. | Aden | 17,184 | ·023 | 0 | 0 | 5½ |
| 54. | Cape de Verd Islands | 11,094 | ·015 | 0 | 0 | 3½ |
| 55. | Oldenburg | 10,009 | ·013 | 0 | 0 | 3 |
| 56. | Tunis | 7,549 | ·010 | 0 | 0 | 2¼ |
| 57. | Algeria | 6,917 | ·009 | 0 | 0 | 2¼ |
| 58. | Falkland Islands | 2,841 | ·004 | 0 | 0 | 1 |
| 59. | Dutch Guiana | 2,130 | ·003 | 0 | 0 | 0¾ |
| 60. | Ports of the Red Sea | 788 | ·001 | 0 | 0 | 0¼ |
| 61. | Pondicherry | 443 | ·001 | 0 | 0 | 0¼ |
| 62. | Greenland | 282 | — | — | | |
| 63. | Heligoland | 238 | — | — | | |
| 64. | Eastern Coast of Africa | 224 | — | — | | |
| | | £74,448,722 | 100·000 | £100 | 0 | |

## SUGAR PRODUCE.

The following valuable Table of the quantities of sugar annually produced in different parts of the world, is extracted from a series of similar useful statistical returns, recently published by Dr. E. Stolle, of Berlin:

### 1. Cane Sugar.

| | Cwts. | Cwts. |
|---|---|---|
| I. In the English Colonies: | | |
| The Antilles | 3,060,000 | |
| Mauritius | 1,000,000 | |
| East Indies and Ceylon | 2,970,000 | |
| | | 7,030,000 |
| II. In the Spanish Colonies: | | |
| Cuba | 5,000,000 | |
| Porto Rico | 1,000,000 | |
| The Phillipines | 500,000 | |
| Andalusia | 150,000 | |
| | | 6,650,000 |
| III. Brazil | | 4,000,000 |
| IV. The United States: | | |
| Louisiana | 2,624,860 | |
| Texas | 70,170 | |
| Florida | 17,410 | |
| Georgia | 12,730 | |
| Mississippi | 2,780 | |
| South Carolina | 1,500 | |
| Alabama | 280 | |
| | | 2,729,730 |
| V. Dutch Colonies: | | |
| Java | 1,000,000 | |
| Surinam | 300,000 | |
| | | 1,300,000 |
| VI. French Colonies: | | |
| Martinique | 468,134 | |
| Guadaloupe | 400,928 | |
| Bourbon | 417,868 | |
| Guyana | 6,410 | |
| | | 1,293,340 |
| VII. Danish Colonies: | | |
| St. Croix and St. Thomas | | 150,000 |
| Total Cane Sugar Exported | | 23,153,070 |

N.B.—To this must be added the quantity consumed in the various countries, which must be nearly equal in amount to that given above.

### 2. Beet-root Sugar.

| | Factories. | Cwts. | Cwts. |
|---|---|---|---|
| I. France | 333 | 1,327,221 | |
| II. Zollverein | 237 | 1,219,320 | |
| III. Russia | 360 | 300,000 | |
| IV. Austria | 171 | 240,000 | |
| V. Belgium | 40 | 142,876 | |
| VI. Poland | 42 | 60,000 | |
| VII. Great Britain | 2 | 7,000 | |
| | 1,185 | | 3,296,417 |

### 3. Palm Sugar.

| | |
|---|---|
| Hindostan; Siam, Sumatra, Java, etc. | 2,000,000 |

### 4. Maple Sugar.

| | Cwts. |
|---|---|
| 1. United States— | |
| New York | 100,481 |
| Ohio | 63,634 |
| Vermont | 46,479 |
| Indiana | 37,278 |
| Pennsylvania | 22,658 |
| New Hampshire | 11,624 |
| Virginia | 15,418 |
| Kentucky | 13,778 |
| Michigan | 13,298 |
| The other States | 20,309 |
| 2. Canada | 60,000 |
| Total Maple Sugar | 404,957 |

## HOME CORRESPONDENCE.

### DUTY ON PAPER.

Sir,—Although not so important as those previously mentioned, another very interesting branch of manufacture, much injured by the duty on paper, is that of the pasteboard maker.

A very large manufacture of pasteboard boxes has arisen in France, employing some thousands of hands, and, not being a laborious occupation, is well suited for females. If this manufacture could be established on a better footing in this country, an extensive field would be opened to the industry of poor females, whose opportunities for earning a livelihood are at present so very circumscribed. Protection in this case is all on the wrong side—we protect the foreigner against ourselves. Imported pasteboard boxes, filled with gloves or fruit, pay no duty whatever as boxes; when imported empty, they pay an *ad valorem* duty of 10 per cent. In this country, such boxes must be made of duty paid materials; and, on the average, 35 per cent. of the value of the pasteboard is not too high an estimate of the sum so paid. It is the opinion of those engaged in the business that a great impetus would be given to the trade by the removal of the duty; at present, they are excluded from large spheres of operation by its existence, particularly where strong material is required, thin wood board being now used and pasted over with paper, the duty on the extra weight of paper necessary to give equal strength amounting to a prohibition of its use.

A slight attention to the shackles with which this manufacture is encumbered will convince every one that very little hope can be entertained of any decided progress until the duty is removed. If the pasteboard-maker be the manufacturer of the paper, he is subject to the same regulations as paper-makers, with a few additional observances. If he does not make the paper, he is required to give twenty-four hours' notice of his intention to receive paper for pasting, must weigh, in the presence of an officer, all the paper he receives, pack in prescribed quantities, affix labels, of which valuable documents he must not lose one under a penalty of 100*l*., give twenty-four hours' notice to charge, and keep the goods, after charged, twenty-four hours, in order that time may be afforded for the visit of a superior officer, who then re-weighs the articles. Thus, the unfortunate pasteboard-maker has to do what, I believe, is unparalleled in any nation—weigh the same goods three times over for revenue purposes, the paper having been previously weighed and duty charged at the paper-mill. By far the larger quantity of pasteboards made undergo three, four, and often five weighings for one payment of duty. The paper is weighed, and the duty charged, by a subordinate, and then re-weighed by a superior officer at the paper-mill; weighed, in the presence of an officer, into the stock of the pasteboard-maker; weighed by an inferior, after pasted, and re-weighed by a superior officer as a check. It then probably goes into the possession of an exporter, where it is again weighed that the duty may be returned. To what purpose are all these weighings at a pasteboard factory—to raise a revenue on paper? No, that has been already done at the paper-mill; but to raise a charge on the paste used, as we find officers are required "to deduct the weight of the paper opened from the weight of the pasteboard charged, the *excess* in the latter being the charge against the trader." The spirit in which officers are expected to perform this part of their duty, is evident from the injunction on them "to enforce a strict compliance with all the legal regulations on the part of pasteboard-makers," a breach of regulation being as much a revenue sin as defrauding the duty.* After all this, it may be thought no ounce of paste used can escape taxation. Curiously enough, by some mysterious manipulation, very little, at least in London, of the paste used pays duty. The whole affair would be ridiculous, if it were not so great a nuisance.

*Paper-stainers.*—It is not with the higher class, so much as with the lower description of stained paper, that the duty materially interferes:

> "The whitewash'd wall, the nicely-sanded floor,"

are more agreeable in poetry than comfortable in reality. From some little acquaintance with humble town and rural life in England and elsewhere, I am led to conclude that the lower classes have no more innate liking for bare walls than the wealthier. Motives of economy frequently induce a preference for the poorest patterns, as expense must necessarily be incurred in obtaining good designs, and the paper-stainer must consequently increase his price. The duty of 30 per cent. on the paper used, if devoted to improvement in the design and execution, would, I conceive, conduce very materially to the Art Education of the people.

That the eye of the most uneducated is not satisfied with a bare wall, is proved from the attempts to relieve the monotony by the extensive purchases of common pictures from hawkers. A quiet, unobtrusive, well-designed paper, not distracting by its glaring colours, but giving repose to the wearied eye, and relieving the more prominent paintings, furniture, and decorations, is a great element of domestic comfort.

The modes, direct and indirect, in which the public would be beneficially affected by a repeal of the duty, are various. Direct benefit would immediately ensue to those who use the coarser description of paper for packing,—as Manchester warehousemen, grocers, hardware manufacturers and dealers. The duty being a very high per centage of the value of this paper, the price would be considerably reduced. Exporters who now frequently experience great inconvenience and loss of time from the forms required to be observed to secure the drawback, would also receive direct benefit. The inconveniences attending the recovery of the drawback can only be known by experience. The necessity of an officer's signature to paper before being cut into letter size—the notice to pack, the weighing, the bond, the attendance of a surety, however trifling the sum to be recovered,—all occupy much time, and sometimes occasion great inconvenience. As an instance, I may mention that within the last few days an Australian buyer, whose time in England being limited, is therefore of great importance to him, remarked on this subject, that the drawback system was a great hindrance to business;—having a large quantity of goods, the packing of which he desired to superintend himself, he had given the usual notice to pack, and had waited the whole of the day, no officer attending; so, notwithstanding his other urgent business, he was compelled to lose the day, not being able to leave, fearing the officer might arrive during his absence. This can scarcely be avoided occasionally, the number of export officers being very limited, and the export trade, of course, variable. In many cases it is preferred to ship the goods without obtaining the drawback, to avoid the chance of delay, particularly when the packages are required to be sent by the mail steamers. These interferences with business, although not very serious in any given instance, yet from their daily occurrence in the numerous small shipments, which make up the total value of paper exported, form an aggregate of no small amount. I could give many instances, if regard for your space did not prevent.

The indirect benefits which would accrue to the public were adverted to in the remarks on Newspapers, Books, and Periodicals, and must be patent to every one. Desirous of having all the Taxes on Knowledge removed, yet mindful of the boy in the fable, who could not withdraw his hand from the jar (was this an Exchequer?), because he grasped too much, I have strictly confined myself to the operation of the Duty on Paper; and sincerely trust that as we have removed the tax on corn—conferring much benefit on the bodies of the people—removed the tax on bricks and glass, greatly to the advantage of our habitations—so we may not be altogether regardless of the superior part of our being, and without delay remove the impediments which prevent the realization of that ideal of humanity—"A sound mind in a healthy body." On the eve of some general scheme of education, I cannot but think it would give much greater confidence in the real interest Government is thought to take in the question, if they would preface their proposal by a Repeal of the Paper Duty, if more cannot at present be afforded. Their proposition would be well ushered in by the announcement—"We will remove all obstacles to the self-education of the people; they shall be the workers and the builders; we the architects, and the directing minds only." The Intellect Ministry might then justly have some claim to our esteem, and write for itself a brilliant page in the Nation's history.

Regretting I should have occupied so much of your space, and hoping some of the remarks may not have been altogether inappropriate,

I remain, yours, &c.

Waima.

## ON THE BEST MODE OF FOCUSING THE PHOTOGRAPHIC APPARATUS.

Sir,—Not having the honour to belong to the Photographic Society, I have only just heard that one of its members proposed at one of the meetings some time ago, a new mode of focusing the instrument in order to obtain a broader effect in portraiture, or when artists make use of Photography for sketches, and studies for compositions of figures, &c.

Upon inquiry, I have found that the mode consists in endeavouring to place the object a little out of focus, instead of endeavouring to focus as correctly as possible.

The author of this suggestion being one of our most eminent miniature painters, and at the same time an experienced amateur in photography, his opinion deserves to be examined, and his views perfectly understood. I must own, that as a photographer, I was not a little startled at the announcement of this idea; but coming from such an artist as Sir William Newton, I would not pass a judgment without mature reflection; and I now wish to discuss the question, in order to discover if the means recommended by Sir William will fulfil the object he is aiming at, and if there are not some better means to arrive at the same result.

About eight years ago, when I began to adopt the practice of taking non-inverted portraits, I observed that I always obtained a more artistic effect when the image had been reflected by a prism, before being refracted in the camera obscura, than when I operated without a prism, and produced inverted portraits. Comparing the two different results with Mr. Talbot, that gentleman observed, that the pictures taken with the addition of the prism were softer and more harmonious than those taken without the prism; and in trying to explain the cause of the effect, we came to the conclusion, that the slight imperfection inseparable from the use of the best glass prism of a considerable thickness, which did not refract the rays in a mathematical regularity, but with a certain degree of confusion, owing to the want of the matter in all the parts of the prism being perfectly homogeneous, and that the softness of effect was produced by the rays slightly overlapping each other where they ought to be separated.

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* The intelligence which draws up the regulations to which manufacturers are subject, is displayed in the following information, officially communicated by the Board of Excise to its officers:—"Rags are bleached by the addition of muriatic acid, which is *a chemical mixture* of salt, manganese, and oil of vitriol, prepared for the purpose;" and "inferior kinds of writing-paper are merely sized with alum." Chemists and paper-makers have yet to learn something, if these statements are true.

I was struck with this fact, and I began a series of experiments on the subject. I placed before the plate in the camera a very finely-ground glass, and I found that the sharp image of a well-focused, first-rate object glass, was by that means considerably softened, and the effect very artistic. Some time after, mentioning this experiment to Sir David Brewster, that eminent philosopher told me that he himself had found a great advantage in the production of positive Talbotype pictures, by placing between the negative and the positive a very thin sheet of tissue-paper.

If I rightly understand the idea of Sir William Newton, these results are exactly those which he wishes to obtain in endeavouring to operate a little out of focus; and I can well understand why a real artist is desirous of avoiding that too minute correctness of details in a photographic portrait,—a composition produced by a perfect lens at its exact focus. But there is a means to produce a better effect than by putting the image out of focus, namely, by the interposition of a slightly opaque medium; and the following are the reasons for the preference.

If it were possible to have all the various planes of the subject, or composition at the exact focus, a small error in that focus would be the same for all the various planes of the picture, and that error obtained on purpose might soften the harshness of detail, and produce on the whole a more artistic effect. But it is not so; there is only one plane for which we can get an exact focus; all the others are out of focus, and the more so as they are farther before or behind that plane. So that if the eyes are in the exact focus, the ears and the nose are out of focus, but not in a very conspicuous degree. If the body is turned on one side, and the shoulder or arm which is nearer the apparatus are in the exact focus, the other shoulder and arm are devoid of the same sharpness of outline; and when the shoulder and arm, the more distant from the apparatus, are in good focus, the front part of the body is not so sharp. In fact, the rays converging on one point, by crossing each other, form two opposite angles, the apices of both being on the point of convergence, and from that point the rays converging more and more, the confusion increases the more the objects are put out of focus.

It is, therefore, very clear that if we focus on the most important part of the subject, such as the face, and then push the tube of the lens in or out in the slightest degree, we have the means of softening the harshness of details of a too well defined face; but if we push the tube out, the parts before the face will be more confused than they were before; and if, on the other hand, we push it in, the parts behind will be more confused than they were before. The difference will be incongruous in both cases, either for the nearer or for the more distant parts. The confusion in these parts will be such that the drawing will be false, and the outline deficient.

Therefore, as it is not possible to put all the parts of the picture out of focus in the same degree, and as by the interposition of a slightly opaque medium we may have the same degree of softening effect upon the whole picture, it is preferable, in order to produce the artistic result aimed at by Sir William Newton, to focus the apparatus as correctly as possible for the middle plane of the picture, and to operate through such a medium as I have mentioned.

This subject is as important as Sir William asserts, and if examined carefully, some good may result from the inquiries. The idea is quite rational in its object; but I think that in considering the defects of altering the focus, he will find that it is inconsistent with the scientific considerations of the laws of optics, and for that reason impracticable.

I am, Sir, your obedient Servant,

A. Claudet.

## RAILWAY ACCIDENTS.

### COMMUNICATION BETWEEN GUARD AND DRIVER.

Sir,—Your correspondent "Inquirer" makes out a very elaborate statement of objections to the plan proposed by the Committee of Managers of the Railway Clearing House; but he appears to assume that it is absolutely indispensable to the carrying out of that plan, that the line or cord of communication should be continuous, and in one piece. If he had thought a little more on the subject, he would have discovered that it was quite consistent with the plan proposed, that the line might be in separate and detached pieces, each piece being rather longer than the carriage—that is to say, about as long as the distance between the faces of the buffers when "hard up"—and terminated at each end by an ordinary swivel hook. If a line of this kind was attached to every carriage in some uniform position, there would be no difficulty in attaching to, or detaching from, the train, any number of carriages that might be desirable, and with scarcely an appreciable increase of time over the present system. This too, I think, disposes of "Inquirer's" remarks as to the balance weight; and for the material of the line, I believe the Committee did not definitely settle what this should be, any more than they did all the minute details of the plan recommended by them. They simply advised the adoption of a certain system, as being of all those brought before them, the most likely to meet with general success; leaving it to each engineer, railway manager, or other official, to make such modifications in, deductions from, or additions to the plan suggested as experience might dictate, and the peculiar circumstances of each case appear to render necessary. They clearly guarded themselves against the idea that they wished to impose upon the public, or their professional brethren, a universal remedy for every ill, but expressly, and as it humbly appears to me, very wisely, left it to the discretion of the parties concerned to make such alterations as to them seemed advisable to meet any particular case. Yours, &c.

Hard-up.

## THE TORSION COMMUNICATING SIGNAL FOR RAILWAY TRAINS.

Leeds, March 28th, 1853.

Sir,—As the means for communicating between the guard and the driver of a railway train are engaging the attention of the public just now, will you permit me to describe a contrivance I have invented for this purpose, which consists in bringing into action the only description of independent motion which cannot be interfered with by any of the various irregular movements to which such trains are liable, viz., torsional or revolving motion at right angles to the progress of the train. All the various modifications of the *tension* or bell-pull principle of communicating signals are subject to one common defect—that of the actuating force being in the same direction as the motions to which the train itself is subject. Hence, occasional contractions or elongations in a railway train—which take place to a greater or less degree according to its extent, sometimes to the amount of many yards—produce either a corresponding accumulation of slack line, which must be gathered up in some way before the signal can be acted upon; or, from sudden expansion in the train's length, cause such a strain upon the communicating line, that, unless the whistle or other signal be loaded with a resisting power sufficient to counteract it, it may be acted upon by back friction, and a false signal given. Such a resisting power in the signal must necessarily be a great hindrance to its free and effective working. A torsional transmission of motion, on the other hand, having nothing in common with any of the ordinary motions of the train, is not liable to be affected by these motions; and no resistance to the free operation of the signal is necessary. Neither is the torsional principle altogether new, as applied to railway carriages; it is, in fact, already in use upon every railway in the kingdom, in the transmission of power from the guard's winch-handle to the brake beneath. And in case it should be hereafter deemed advisable to concede to passengers themselves, under due restrictions, a power of actuating a danger signal in cases of emergency, the torsional principle would afford peculiar facilities and guarantees in so doing.

In this invention a tube extends along the under frame of each carriage, and is free to revolve in its collars or bearings. Within each tube there are plungers, with free sliding motion, similar to buffer rods, except that the plunger is prevented from revolving independently of of its tube, by the insertion of a screw plug into a longitudinal slot or groove. At the extremity of each plunger is inserted a Hooke's universal joint, which not only permits the end of the plunger to hang down out of the way when not in connection with another carriage, but also permits the torsion-rod to accommodate itself, when in connection, to every possible irregularity of motion: so much so, that even if the train were to assume the form of the letter S, the torsional transmission would not be interrupted.

The apparatus can be so coupled as to form one continuous bar,—capable of yielding to, and of absorbing every motion, save and except *torsional* motion, which alone will be transmitted unchanged; two sliding ferules clasp the splice together, and the protruding pegs serve not only to render the splice immoveable, but also prevent the ferules from sliding off. The peculiarity of this coupling is, that while it is very readily put together and detached, its two parts resemble each other exactly, so that either end of a carriage, indifferently, may be presented to, and coupled with, either end of its neighbour.

The chain, barrel, and winch-handle, are introduced to show in what manner the torsion-bar may be acted upon from the interior of the guard's van. Of course the same effect might be produced by what are called bevel wheels, but the plan represented is simpler and cheaper.

Yours, &c.,

ANDREW EDMUND BRAE.

## PROCEEDINGS OF INSTITUTIONS.

BASINGSTOKE.—The Twelfth Annual Meeting of the members of the Mechanics' Institution took place on Thursday evening; the chair was occupied by the Mayor (C. Simmons, Esq.), one of the Vice-presidents. The honorary secretary, Mr. F. W. Bushell, read a very satisfactory report of the financial position and general proceedings of the Institution for the past year, which showed a balance in hand, after discharging all liabilities, of 58*l.* 14*s.* 7*d.*,—being 6*l.* more than last year. The number of members is, at present, 186. The library consists of 1,319 volumes, of which 26 have been presented and 49 purchased since the last meeting. During the year, 3,056 volumes have been issued. The Reading-room is also extensively used by the members, and it is gratifying to find by the report that the Music and Discussion classes still maintain their efficiency, and that another class has recently been established for the study of mathematics. The thanks of the meeting were unanimously voted to the President, Vice-presidents, Treasurer, and Secretary, and the same gentlemen were re-elected for the year ensuing. The cordial thanks of the meeting were also awarded to the members of the retiring Committee, seventeen of whom were re-elected, and in addition Messrs. Elford, Attwood, Bramsley, J. Moody, Williams, Garry, and Alderman Hulbert. Some steps are about to be taken for establishing a "Building Fund," in connection with the Institution.

On Thursday evening a Lecture was delivered on "Political Economy," by Mr. George K. Rickards. The lecturer explained that it was the duty as well as the interest of both rulers and people to study and make themselves thoroughly acquainted with so useful a science, the practical and beneficial operations of which, when properly understood and justly acted upon, were proved, by recent experience, to promote very essentially the prosperity and progressive happiness of all classes of society.

CARLISLE.—On Tuesday evening last, T. T. Relton, Esq., delivered the last of a series of Lectures in the Mechanics' Institution, on "Nineveh; its Antiquities and recent Discoveries." The Lecture was illustrated by a number of diagrams, the gift of G. Moore, Esq., of London, to the Institution, which, combined with the ability of the Lecturer, rendered the Lecture both interesting and instructive.

EDINBURGH.—On Friday evening, the session of the Philosophical Institution was closed, by an address from the Lord Advocate. The attendance was unusually numerous, and comprised many of the Directors of the Institution. The Lord Advocate, after a few introductory remarks, in which he stated that his theme would be the social position of our country at the present day, proceeded to take a review of the past hundred years. At that period, the republic of the West was a subservient and not very productive colony; the East India Company had but acquired their factory at Madras; the continent of Australia was all but undiscovered, Johnson sat on his autocratic throne; the powers of the steam-engine were unknown; the debates in Parliament were reported as the proceedings of the political club; and the capital of Scotland, the court of the Pretender, in Holyrood, and the victory of Prestonpans, were topics of recent memory. The previous age, from the Revolution downwards, had been one of brilliancy and force. The period which intervened between that stage and the next, in 1793, was the golden age of parliamentary eloquence and of mental philosophy. But if England at that day, cold and lifeless as she was in the aspirations of genius, gave to liberty the noblest specimens of free discussion that were ever laid on her altar, the Scotch philosophers of the nineteenth century were quite as remarkable as the English orators. As the great orators fell one by one, and mental philosophy lost its charm to please, there succeeded a band of minstrels, a chorus of song, more than worthy of the age of Elizabeth. We have now reached another stage. The orators gave way to the poets, and now the poets themselves become gradually mute, and no one takes up their song. But about the end of that period came that sudden development of the mechanical mind of Europe which, in the space of thirty years, had inverted the relations of time and space; altered, so to speak, the magnitude of the globe; and changed the very face of Nature herself, as regards man's interest in, and power over it. It seemed to him that steam machinery, steam navigation, railway travelling, and the electric telegraph, had given the world an impulse which almost nothing short of a convulsion of Nature could again retard. About 1820, too, the banner of education was unfurled. Then, for the first time, society condescended to think for the working man; and then commenced, amid many obstructions and great discouragements, that war with ignorance which had since gained so many victories, and was destined, he trusted, to gain many more.

Exeter.—The following Report of the Council of the Western Literary and Scientific Union to the Associated Institutions, has just been published: — The Council elected at the last Annual General Meeting of Delegates, beg to report the following results of the Premiums offered for Essays:—The Premium of 5*l.*, offered by the Union, for the best Essay, under the title "Ancient and Modern Civilisation Compared," has been awarded by the judges (Lord Courtenay and Sir Stafford H. Northcote, Bart), to the Rev. Micaiah Hill, of Kingsbridge. The Premium of 5*l.*, offered by John Sillifant, Esq., President of the Union, for the best Essay on "The Effects of Railways on the Physical, Moral, and Social Condition of the Districts within their range," has been awarded to Mr. W. H. Geachsias, of Exeter, by the judges, John Sillifant, Esq., and G. S. Curtis, Esq. The Premium of 5*l.*, offered by John Morth Woollcombe, Esq., for the best Essay on "The Antagonism of Nature, exhibited in the conflict between the Weeds and Useful Products of the Earth," has been awarded by the judges (J. H. Hippesley, Esq., and William Miles, Esq.), to Mr. Barnett Blake, late editor of the *Exeter Gazette*. It is probably well known to the majority of the western Institutions that the Society of Arts in London has taken into consideration the propriety of connecting with itself the Literary and Scientific Societies and Mechanics' Institutes of all parts of the United Kingdom, on a plan and with objects very similar to those of this Union. The execution of this design was resolved on at a conference in London, between the Society of Arts and the Delegates from about 140 of the country Institutions. This Union was represented at the Conference by its President. A very general appreciation was evinced of the advantages of thus associating the provincial societies, many of which have already secured to themselves the benefits to be derived from the arrangement. The testimony, thus borne by so important a body as the Society of Arts, to the soundness of the principles which led to the establishment of this Union, has been observed by the Council with deep interest and satisfaction. With the desire, therefore, of ascertaining in what manner these principles may be best promoted and extended, the Council have attentively considered this important movement, and have resolved to make the following recommendation on the course to be pursued by this Union. It appears to the Council that the Society of Arts, from its metropolitan position, possesses facilities for accomplishing the objects desired, with greater success than any provincial union could expect to achieve; and that if the two bodies were to attempt to conduct similar operations in the same locality, they would not improbably impede each other, and thus prejudice the cause they are mutually seeking to advance. The Council therefore conceive that the best interests of the allied Institutions will be consulted by leaving the field clear for the free prosecution of the plans of the Society of Arts; and they recommend accordingly, that, relinquishing whatever may be the advantages of a Provincial Union, the Institutions of which it is composed should transfer themselves to, and merge themselves in, the great Metropolitan Union founded by the Society of Arts. In considering to what extent the Union has fulfilled the intentions of its founders during the period of its existence, the Council believe that no slight ground of satisfaction will be afforded by the retrospect. Although complete success may not have been attained in the working details of the lecture department, yet it may be safely asserted that the collateral benefits of the Union have been widely diffused, and that they have been more especially felt by the smaller Institutions. There can be little doubt that it has had the effect of increasing the public interest in favour of Literary Institutions, in multiplying their numbers, in extending a knowledge of their advantages, and in promoting a warmer sympathy and better understanding between the members of the various societies; an interest and a sympathy which, it is hoped, will long survive the Union itself.

John Sillifant, *President.*
Robert Dymond, jun. } *Hon. Secs.*
R. C. Halse,

*Exeter, March*, 1853.

Greenock.—The Twelfth Annual Report of the Mechanics' Institution states that the course of Lectures during the past session has been eminently successful, which has afforded evidence to the Committee that their efforts in this direction are duly appreciated. Both the Library and Reading-room are well supported; to the former there have been numerous donations, while to the latter has been added a small library of reference. By a reference to the Treasurer's abstract statement it is observed that there has been a gradual reduction of the debt on the Institution; and the Committee impress upon the members the necessity of continuous efforts to remove this burden, which materially impedes the successful working and usefulness of the Institution.

Newport.—On Tuesday, the 29th ult., the Committee of the Athenæum held an Exhibition and *Conversazione* in the Town Hall. Among the objects exhibited in action, were a printing-press, a lithographic press, and an apparatus for cooking with gas. There was also a numerous collection of paintings, pieces of sculpture, bronzes, and castings; the latter, belonging to the Coalbrookdale Company, were obtained by Mr. W. M. Jack, one of the Secretaries. In the evening addresses were delivered by the President (H. J. Davis, Esq.), the Rev. E. Hawkins, and the Rev. J. Barfield. The entertainments were closed with a concert.

Penzance.—Mr. W. H. Rodd, one of the Secretaries of the Institute, lately brought under the notice of the

Town Council, the importance of endeavouring to secure the local establishment of an Elementary Drawing School. A committee of inquiry was appointed, which has reported on the information received; and it is believed that very shortly the necessary requirements will be obtained, prior to making application to the Department of Practical Art for a master, and other aid.

**Thame.**—On Tuesday, the 22nd March, Mr Hughes, delivered his lecture on "Earthquakes and Volcanoes," to the members and friends of the Mutual Improvement Society. This being the first lecture arranged through the medium of the Society of Arts, it is gratifying to have to report that the attendance was as large as could possibly be expected, and that the interest of the audience was sustained throughout.

**Yarmouth.** — On Thursday evening, the Eighth Anniversary of the Young Men's Institute was celebrated at the Town-hall, by an exhibition of works of art; by addresses by the President, Sir E. H. K. Lacon, Bart., M.P.; T. G. Hake, Esq., M.D.; and William Heane, Esq.; and by a vocal and instrumental Concert. About 500 tickets were issued. The Assembly-room was quite filled with works of art, paintings, statuettes, models, and curiosities, contributed by friends and members of the Institute. All the arrangements were highly creditable to the Society; and the room, when lighted up, presented a pleasing appearance. A dais was erected for the President, Vice-presidents, and their ladies; and near it was a statue intended to represent "Juventa," the Goddess of Youth, advocating the objects of the Institute. Tables were placed on each side of the room, and on them were displayed a great variety of curiosities. The President addressed the meeting on the great advantages that must accrue to his native town by an Institution like the present being in a hopeful and prosperous condition. It supplied young men with the means of spending those evenings profitably which would probably be spent, in too many instances, in an unprofitable manner; it tended to exalt and improve their literary tastes and habits of thought, and was, in every sense of the word, entitled to their patronage and support. He was glad to find, from the official Report, that during the past year the numbers had steadily and satisfactorily increased. The Mayor (S. C. Marsh, Esq.) congratulated the Society upon its success, and hoped that it would increase in numbers, stability, and general prosperity. Dr. Hake and Mr. W. Heane (both of Bury St. Edmunds) delivered Lectures, which were numerously attended.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the Journal regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

"St. George."—A Notice on fixing Photographs will appear next week.

## QUESTIONS FROM CORRESPONDENTS.

*Brown Spots in Paper.*—I am exceedingly desirous of discovering some means of removing the *brown spots*, or stains, by which many of my books—several of them amongst the most valuable—are disfigured. These stains are not produced "by damp or dew;" for though the illustrated editions of Rogers's "Italy" and "Poems" are injured by them throughout, there are other works (as the handsome Stuttgart edition, 1835, of "Schiller's Werke,") in which the plates alone are spotted, and the letter-press is untouched; and in the first edition of Cromek's "Reliques of Burns," no part is stained except the appendix of "Poetry," which is evidently printed upon a different paper. It may be presumed, therefore, that the injury has been occasioned by something used in the bleaching or preparation of the paper; and if you can inform me of any application by which such spots can be removed, I shall esteem myself greatly obliged.—W. M. T. [No. 52.]

*Waterproofing Canvass.*—Can you tell me the best and simplest way to render Canvass or light Duck waterproof? A recipe of easy application would be of great use on many a small farm, for rich clothes are very dear.—F. S. A. [No. 53.]

*Geology of North Staffordshire.*—Can any of your readers favour me with the title of any work or pamphlet, which treats of the Geology of the *North* Staffordshire Coal and Iron-stone Field?—[No 54.]

## MISCELLANEA.

**Museum of Ornamental Art, Marlborough House.** — The numbers attending, &c., during the month of March were as follow: 12,037 persons on the public days and admitted free; 1,091 persons on the students days and admitted as students on the payment of 6*d.* each; besides the registered students of the classes and schools.

**Moore's Patent Spherical, or Great Circle Indicator.**—An instrument of considerable importance to Navigators was exhibited at Sir Roderick Murchison's Geographical *Soirée*, on Monday last. It is another and a great step towards simplifying that most troublesome, but most important problem of Great Circle routes. It consists of four graduated circles of eleven inches diameter; two of which, arranged in opposite planes, represent a meridian and the equator, and over these two others by a most ingenious arrangement, are made to revolve in every direction, so that by two attached compasses, or graduated circles, every element of spherical trigonometry can be readily ascertained by inspection, to a great degree of accuracy; a process also adapted to those problems necessary in nautical astronomy. Without comparing it with other facilities for working spherical sailing, which have lately appeared, it will be an acceptable assistant to those who are now beginning to see the necessity of adopting every facility for the greatly increased range of commerce. It is believed that in a few years this system will again resume its place, which the projection invented by Mercator and Wright has quite kept out of view for so many years.

**The Boomerang Propeller.**—On Tuesday afternoon a trial was made in the Mersey, at Liverpool, of Sir Thomas Mitchell's new mode of propelling ships by the boomerang, in lieu of the common screw. The boomerang is a crescent-shaped weapon, used by the natives of Australia; but, instead of an arc, it has an elbow in the middle. It is about two feet long and about two inches broad, a quarter of an inch thick, and is made of heavy wood. When thrown in the air by the natives, it describes two revolutions — one direct, and the other rotary. By the latter motion it revolves round its own centre of gravity, is enabled to survive the direct impetus with which it is sent up, and is made to screw back to the spot whence it was thrown. It appears that the difficulty of applying this invention lies in the fact that screw vessels are built with apertures too narrow for its application in its entire and complete form, as it requires a space equal to at least one-third of the height of the aperture. In the present instance, the invention was applied in mutilated portions to the *Genova*, one of Messrs. M'Kean and M'Klarty's Mediterranean steamships—its freedom from choking at the centre, due to the convexity of one blade and the concavity of the other, being principally relied on. The reduction was so great, that whereas with ordinary steamers the boomerang would embrace two-thirds of the helix at once, the two blades of the one used in the *Genova* were not more than one-seventh each of the complete spiral, or less than one-third of the whole. The pitch was 23 feet 2 inches, the diameter 12 feet 3 inches, and the weight only 26 cwt.—making five feet less surface than the ordinary common screw, weighing 62 cwt. Notwithstanding these circumstances, the speed attained in slack water was from 9 knots to 9¼ knots, under a pressure of steam of from 6 lbs. to 9 lbs. It is said that Messrs. M'Kean and M'Klarty are so satisfied with the result of the trial, that they intend applying the invention in its integrity to one of their ships.

Flax in Ireland.—The monthly meeting of the Committee of the Royal Society, for the improvement of the growth of Flax, was held in Belfast, on 30th of March, Richard Niven, Esq., Chrome Hill, in the Chair. A sample of perennial flax was shown, which had been found growing wild in the county Cork. A letter was read from Mr. John Egan, Limerick, enclosing a sketch of a new scutching machine invented by him, which he stated to be capable of cleaning ten cwt. of fibre daily, with the labour of four persons. The Committee recommended him to have a machine constructed, and promised to give it a fair trial in comparison with others. The machine invented by Mr. M'Bride was reported to be ready for trial at Belfast, and it was arranged that its merits should be fairly tested along with other new inventions of scutching machinery. Mr. De Kock, the society's Belgian instructor, had returned from a trip to Flanders, where he had contracted for three oil mills on the Flemish model, which would be erected by private individuals in Ireland. Attention was drawn to a new machine for cleaning and scutching tow, the invention of Messrs. Calvert and Garnett, of Cleckheaton, Yorkshire, a letter from whom was laid before the meeting, inclosing a specimen of the metal teeth used for the purpose. The machine consists of metal cylinders armed with these teeth, and it was stated to do its work much more perfectly than the implement termed a "devil," which is commonly employed for the purpose. It was further stated to be capable of cleaning thoroughly not only the ordinary scutch mill tow, but also that of the coarsest and dirtiest kind produced by the buffing socks, and to convert it into fibre worth 10*l*. to 12*l*. per ton. A great quantity of this sort of scutch mill refuse has been hitherto burnt, as it was found that no means previously adopted had been successful in cleaning out the fibres. Hence, if generally adopted in scutching districts, the new machine might prove of great advantage in enabling the waste to be turned to more profitable account.

New Materials from Western Africa.—We have been favoured by Mr. Thomas Clegg, of this town, with samples of two new materials for textile manufacture, which have been recently received from the southwest coast of Africa, and which, if they can be furnished in sufficient quantity, and at a moderate price, will probably become important articles of trade with that country. The first of these is a fibrous substance, sent by a missionary at Abbeokuta, as "red cotton." It is not produced in the neighbourhood of that place, but is brought thither from the Hoassa country to the northward, in considerable quantities; and the people who bring it state that the deep red colour which it bears is natural; but the writer of the letter adds, that the chief at Abbeokuta "thinks they lie." The scepticism of the chief is undoubtedly well founded. The material, which is not cotton at all, but an entirely new species of silk, is unquestionably dyed, probably with alkanet-root, which, we believe, is abundant in Africa. If sent in its natural state it will undoubtedly prove a very useful material for the waste silk spinners. The letter does not contain any information as to the price which this material bears in Africa; but as it is stated to be produced in great abundance, it seems probable that the price will be moderate. The other material to which we have referred is a new and somewhat peculiar description of wool, stated to be brought from Quitta, a town on the coast to the westward of Abbeokuta; but as the climate of the coast must be very unfavourable for the production of wool, we think it is probably brought from some of the mountainous regions in the interior of the continent. Like the dyed silk, it was sent to this country as a sample of cotton, and with it was some yarn purporting to be spun from it. That, however, is unquestionably an error, as the yarn is made from cotton. The wool seems of tolerably fine quality, of a pale buff colour, apparently natural, and is worth, we are told, about 1*s*. 3*d*. per pound. If it can be found in quantity, it will prove a very acceptable boon to the woollen manufacturers of this country, whose supplies of raw material have latterly proved very insufficient.—*Manchester Guardian.*

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

*Delivered on 19th, 21st, 22nd, 23rd, 26th, and 31st March, and 1st, 2nd, and 4th April,* 1853.

Par. No.
141 (1). Occupiers (Ireland)—Summary of Return.
190. Duchy of Cornwall—Account.
205. Emigrant Ships—Copies of Reports.
215. Railways—Memorandum.
242. Committee of Selection—Fourth Report.
243. Norwich Election Petitions Withdrawal—Report.
191. Local Acts—Reports of the Admiralty.
121. Mails to Calcutta and Australia—Reports.
281. Sir James Brooke—Correspondence.
152 (1). Lancaster Borough Election—Index to Evidence.
210. Chatham Election—Minutes of Evidence.
216. Joint Stock Companies—Report.
221. Brewers, &c.—Account.
260. Barbadoes, &c.—Despatches.
151 (1). Canterbury Election—Index to Evidence.
214. Rolls and Records (Chester Castle)—Mr. Black's Report.
224. Clitheroe Election—Minutes of Evidence.
232. English Oak Timber (Navy)—Return.
251. Mercantile Marine—Circulars.
255. Chatham Borough—Return.
265. Russian Dutch—Account.
269. Immigrants and Liberated Africans—Return.
278. Public Debt—Account.
206. Canterbury Association—Correspondence.
230. Poor Relief (Ireland)—Return.
237. Common Lodging-house Act—Report of Capt. Hay.
250. Ramsgate Harbour—Report of Capt. Vetch.
250 (1). Ramsgate Harbour—Report of Mr. J. Walker (Reprint of No. 678 of 1851).
256. Rate in Aid (Ireland)—Account.
271. Dockyard Appointments—Correspondence.
272. Dockyard Promotions—Admiralty Order, &c.
213. Ecclesiastical Commission (Ireland)—Return.
236. Coals (London)—Return.
249. Mr. Robert Burns—Letter from Capt. Massie.
270. West India Mail Steamers—Return.
219. Derby Election—Minutes of Evidence.
233. Public Works Loan Commissioners—Account.
235. Hydrographical Survey—Return.
244. Houses—Return.
257. Consolidated Annuities (Ireland)—Account.
266. Eastern Archipelago—Copy of Despatches, &c.
279. New Churches—Thirty-second Annual Report.
243. Norwich Election Petitions Withdrawal—Report and Evidence.
234. Bills—Combination of Workmen.
239. ,, —Attornies' and Solicitors' Certificate Duty (No. 2).
238. ,, —Copyholds.
240. ,, —Universities (Scotland).
241. ,, —Sheriff and Commissary Courts (Berwickshire).
245. ,, —Whichwood Forest.
229. ,, —Absconding Debtors (Ireland).
247. ,, —New Forest Deer Removal (amended by Select Committee.)
282. ,, —Merchant Shipping.
248. ,, —Parish Constables (as amended by the Select Committee).

Ecclesiastical Commission (England)—Fifth General Report; "Queen Victoria" Steamer—Report of Capt. Walker; Church Estates—Second General Report of Commissioners; Australia (Recent Discovery of Gold)—Further Papers; Law of Divorce—First Report of Commissioners; Burmah—Further Papers relating to Hostilities; Medical Charities (Ireland)—First Annual Report; Public General Acts—Cap. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 15.

*Delivered on 5th April.*

116. County Officers (Ireland)—Return.
227. Tavistock Election—Minutes of Evidence, &c.
274. Highland Roads and Bridges—Thirty-ninth Report of the Commissioners.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette,* 1st *April,* 1853.

*Dated* 31*st Jan.*

264. C. Cattnach—Measuring human figure, and transferring same to cloth.

*Dated* 14*th March.*

633. Lord Howard de Walden—Cleansing sugar, by application of steam and hot air in a centrifugal machine. (A communication.)
639. J. Scott—Manufacture of animal charcoal.
641. W. Bashall—Improvements in dressing, sizing, and tape machines.

*Dated* 15*th March.*

643. T. J. Herapath—Treatment of sewage, and manufacture of manure.
645. F. Durand—Improved loom.
647. P. M. Parsons—Working valves of steam-engines.

*Dated* 16*th March.*

649. G. Knight and J. Heritage—Drying bricks and articles made of clay.
651. C. H. Wild—Fishes and fish-joints for rails.
653. H. R. Fanshawe—Fire-arms.
655. J. Oliver—Venetian red.

*Dated* 17*th March.*

657. J. Livesey—Pile and looped fabrics, and machinery for same.
659. W. Blinkthorn—Furnaces and annealing kilns for glass.
661. J. Roscoe and R. Bullough—Apparatus for raising water.
662. J. Bottomley—Figured pile fabrics.

*Dated* 18*th March.*

663. R. Peters—Machine for mortising, &c.
664. J. A. A. and S. Tweedale—Spinning machinery.
665. P. Cameron—Marine and surveying compasses.
666. W. K. Westly—Improved comb for heckling, &c.
667. J. H. Johnson—Improvements in steam-engines. (A communication.)
668. M. Baxter—Improvements in steam-engines, and pressure regulating valves.
669. R. A. Brooman—Machine for weighing or measuring and packing spices, &c. (A communication.)
670. A. E. L. Bellford—Power-looms. (A communication.)
671. J. Haskett—Grinding-stones and whet-stones. (A communication.)
673. C. Harratt—Strengthening masts.
674. R. O. Christian—Bed-hangers for emigrant ships, &c.
675. R. O. Christian—Ventilation.
676. A. W. Banks—Life-belts.
677. G. Ross—Lubricating oil, &c. (A communication.)
678. G. Mackay—Manufacture of iron. (A communication.)
679. R. B. Tennant—Machinery for pulping coffee.

*Dated* 19*th March.*

680. J. Eldridge—The rotary washing-machine.
681. J. Haley—Communication between guard and driver.
682. H. Bousquet—Manufacture of manure.
683. G. Dalton—Smelting iron ore, &c.
684. J. H. Johnson—Regulating steam-engines, and other prime movers. (A communication.)
685. S. Radcliffe and H. W. Whitehead—Machinery for setting surfaces of cylinders in carding-engines.
686. A. V. Newton—Oil lamp. (A commuincation.)

*Dated* 21*st March.*

687. J. Fraser—Manufacture of portable packages.
688. W. W. Collins—Looms. (A communication.)
689. T. Sykes—Treatment of soapy and greasy waters. (A communication.)
690. M. Poole—Generating steam.
691. J. M. Durnerin—Apparatus for extracting liquid out of solid substances, applicable to treatment of fatty matters.
692. M. Poole—Obtaining power where air is employed. (A communication.)
693. J. Taylor—Printing woven and other fabrics.
694. J. Bassham—Communication between guard and driver, and other persons in trains.
695. J. Brett—Portable sketching apparatus.
696. J. Stather—Improvements in printing.

*Dated* 22*nd March.*

697. E. Maw—Connecting sheets of corrugated iron in construction of houses, &c.
699. T. Bouch—Improvements in signals.
700. J. H. Johnson—Smelting iron and other ores. (A communication.)
701. W. Johnson—Rolling and shaping metals. (A communication.)
702. N. G. Norcross—Machinery for planing.
703. F. Futvoye—Improved apparatus employed in games of chance.
704. H. H. Henson—Improvements in buffers.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed* 2*nd April,* 1853.

319. James Johnson, of Worsley, Lancashire—Improvements in heating, ventilating, and sewering cottages or dwelling-houses.
359. Leon Godefroy, of Paris—Improvements in covering or packing rollers for printing fabrics.
362. William Tatham, of Rochdale—Invention of an improved mode or improved modes of preventing accidents on railways.
394. Robert Hawkins Nicholls, of Bedford—Invention for horse-hoeing land.
458. Peter Evans Donaldson, of Shrewsbury—Improvements in dams, locks, and lock-gates.
465. Joseph Cundy, of 21, Victoria-grove, Kensington—Improvements in hot-air stoves.
492. John Holmes, of Manchester—Improvements in lathes.
494. Philip Berry, of Manchester—Improvements in machinery or apparatus for manufacturing bolts, and nuts, and other similar articles in metal.
548. William Thorp, of Collyhurst, near Manchester—Improvements in steam-boxes, and the mode of heating press plates used in hot-pressing of silks, de laines, cobourgs merinos, fancy goods, and other similar fabrics.
736. Somerville Dear, of Leeds—Improvements in the arrangement and apparatus of looms for weaving centre or other large patterns or designs in linen, cotton, silk, wool, or other fibrous materials.
1155. Joseph Burch, of Crag-hall, near Macclesfield—Improvements in machinery for reaping, loading, stacking, and storing grain, and other agricultural produce.
1156. Joseph Burch, of Crag-hall, near Macclesfield—Improvements in machinery applicable to thrashing, winnowing, cleaning, and sorting grain, and to other agricultural purposes.
1157. Joseph Burch, of Crag-hall, near Macclesfield—Improvements in passenger and other carriages.
69. Joseph Beattie, of Lawn-place, South Lambeth—Improvements for economising fuel in the generation and treating of steam.
368. Robert Davis Rea, of St. George's-road, Southwark—Improvements in bits.

*Sealed* 5*th April.*

227. Benjamin Mitchell, of Romsey, Hants—Improvements in the construction of artificial legs.
288. Augustus Waller, of Bonn, Rhine, Prussia—Improvements in the means of measuring or ascertaining the quantity of alcohol and other substances in brandy, wine, beer, and other liquids.
302. William Townely, of 2, Bartlett's-buildings, Holborn-hill—Invention of improved machinery or apparatus for watering and flushing streets, squares, courts, and other localities.

*Sealed* 6*th April.*

284. George Simpson, of Manchester—Improvements in machines or apparatus for weighing.
324. Thomas Restell, of the Strand—Improvements in chronometers, watches, and clocks, part of which improvements is applied to roasting-jacks.
329. Auguste Edward Loradoux Bellford, of 16, Castle-street, Holborn—Improvements in the construction of revolving or repeating fire-arms.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| March 31 | 3438 | Clapp's Hinged Mould and Cutter, for Casting Bullets or Balls, Solid or Hollow, Conical, Round, or any other shape | William John Clapp | 8, St. James's-pl., St. James's, Exeter. |
| „ „ | 3439 | Lever and Ferrule for Safety-valve | John Cawood and Joseph Sunter | Derby. |
| „ „ | 3440 | Gold-digger's Dwelling | Job Skudder | Lower-road, Deptford. |
| April 5 | 3441 | The Elastic Abdominal Belt | Mrs. Thomas Groom | 1, Sussex-terrace, Lorrimore-road, Walworth. |
| „ 6 | 3442 | The Registered Fast-handled Table-knife | Marsh, Brothers, & Co. | Sheffield. |

# SOCIETY OF ARTS.

**FRIDAY, APRIL 15th, 1853.**

## SIXTEENTH ORDINARY MEETING,

*Wednesday, April 13th,* 1853.

The Sixteenth Ordinary Meeting of the Society was held on Wednesday, the 13th instant, the Right Honorable Lord Wharncliffe in the chair.

The following were elected Members:

Collins, Edward, 314, Oxford-street.
Curtis, William, Alton, Hants.
Davis, Elias, 54, Tavistock-square, and Aldgate-high-street.
Merrifield, Mrs. Mary P., 8, Dorset-gardens, Brighton.
Ord, Augustus W., Abingdon-street, Westminster.
Pinkney, Robert, 26, Long-acre.
Ruff, Edward, 9, Prince's-place, Kennington-road.
Verinder, John H., 79, St. Paul's-churchyard.
Wilkinson, John, Leeds.

and the names of two candidates for membership were read.

The following Institutions have been taken into Union since the last meeting:

262. Bramley, Mechanics' Institute.
263. Limerick, Literary and Scientific Society.

A paper was read "On Explosions in Mines and Collieries, and the Means of preventing them," by Mr. Robert Blackwood, of Kilmarnock.

After a brief allusion to the importance of the subject, the Author gave a general description of underground workings, stating that when a shaft is sunk to the coal seam intended to be wrought, and when fairly through to the under side of the coal bed, and the direction of the dip of the seam, or inclination of the strata to the horizon properly ascertained, excavations in the face or breast of the coal are made from three to six yards wide, according to existing circumstances. These excavations or drifts are carried forward in a direction at right angles to the dip, forming what are called level headings, and serve the purpose of travelling or drawing roads, for bringing the coals from the working faces to he bottom of the shaft, and also for a course for carrying off the water from the future workings, and a passage for the air current for ventilation. At right angles to these headings other excavations from three to six yards wide are made to the rise of the coal seam, and from ten to thirty yards apart, according to the size of pillars intended to be left. These are again cross-cut into endings, forming pillars of from ten to thirty yards square, to support the roof and superimposed strata. These pillars are left standing till the mine has been wrought to its extreme boundary, when they are robbed or taken away entirely, the roof of the mine being allowed to come down, or follow of itself. This part of the workings, extending in some cases over an area of several acres, is called the waste, and in fiery mines becomes the reservoir for the carburetted hydrogen, or fire damp, which exudes from the coal. This system of working is what is termed the pillar and bord, or in Scotland the stoop and room system.

For the safe and efficient working of any mine, a proper system of ventilation is necessary, for the free respiration of the workmen, and also for the purpose of carrying off the noxious and dangerous gases that exude from the coal as the work proceeds. The development of carburetted hydrogen gas, or fire damp, the dread of the miner, and the cause of such fearful loss of life, is inseparable from mining operations, being produced from the decomposition of the vegetable matter of which the coal is composed, and lies dormant and pent up in the numerous cavities and fissures of the coal seam. In deep mines, and those in which the coal is of a rich quality, this gas is given off in great abundance from the numerous cavities or pores in the strata being intersected and laid open by the operations of the miners, and is constantly being drained off as fresh faces of coal are exposed. This gas sometimes exists in the seams under very considerable pressure, and rushes out into the workings with great force. When mixed with a certain proportion of common air, this gas becomes highly inflammable when brought in contact with flame, giving rise to fearful explosions, and consequent loss of life, when a miner carelessly, or through ignorance perhaps, exposes his naked lamp or candle to this treacherous atmosphere. Hence the necessity for a vigorous ventilation, and an ample supply of fresh air at all times to the workings, to dilute the atmosphere of the mine below the firing point, and thereby render it harmless and safe for the operations of the miners.

Except where the ventilation is natural (a system that cannot be sufficiently deprecated), the means almost universally adopted for clearing and keeping the mine free of this explosive atmosphere, is ventilation by rarefaction. In a mine where only one shaft is sunk to the coal, a partition, or brattice, generally of wood, is put in, dividing the shaft into two sections from top to bottom, the one termed the upcast, and the other the downcast shaft. At the bottom of the upcast shaft a powerful furnace or cube is kept burning, which has the effect of rarefying the air, and producing an ascending current in the upcast shaft; the cold, pure air going down the downcast, to fill up the partial vacuum caused by the rarefaction, communicates motion to the air throughout the mine, and thereby causes a current of fresh air to circulate and sweep along the face of the coal in process of being wrought, diluting and carrying off the carburetted hydrogen as it is produced, through the furnace, to the upcast shaft, and thence to the external atmosphere.

It will be at once apparent that a copious air current, and the keeping of it in its proper course, is of the first importance, as upon it depend the ventilation of the mine, and the lives of the men employed; as in almost every instance where accidents from explosions of fire-damp occur, the cause may be almost invariably attributed to an insufficiency of air, either from a defective furnace, contracted air courses, or the current being allowed to leak or waste, or otherwise improperly applied. In the process of excavating the coal, the current is kept up to air the face of the workings, by stoppings of brick and mortar being put in, from time to time, betwixt each row of pillars as the work proceeds; so that what was formerly a room or bord, now becomes a passage for the in-take of fresh air as each pillar is formed, thus making a continuous air course from the bottom of the downcast shaft, round the face of the workings, and back again through the furnace to the upcast shaft.

Every one experienced in mining operations is aware of the tendency to leakage and waste in the air course. When it is remembered that some coal winnings extend over an area of several acres, and that the air course must of necessity be lengthened out, as the work advances, so that in such cases the ventilating current has to travel a distance of thirty or forty miles before returning to the upcast shaft; and when, too, it is remembered that throughout the whole extent of the air course, it is kept up to the faces by stoppings of brick and rubbish built in as the coal is excavated, it is not to be wondered at should the current be weak and sluggish in some parts, especially when we recollect that from the moment the current leaves the bottom of the downcast shaft, its constant tendency is to abandon the faces, and rush to the furnace, through any door or crevice it can find, leaving the parts in advance only partially ventilated.

Explosions of fire-damp frequently arise from want of attention to the doors in the drawing roads and air courses, which, except when a miner is passing with his load, should always remain closed. These doors are in some collieries kept by boys called trappers, and in others they are self-acting swing-doors. Colliery managers are divided in opinion, on which of these two systems most dependence can be placed. In either case, this department of the underground management requires the most vigilant oversight; neglect of this is ruinous to the entire ventilation: it matters not how superior and complete the other arrangements of the mine are, the most powerful furnace will be found inadequate for the ventilation of the workings in advance of any door left open, as the current will entirely abandon the face of the workings, and rush straight to the furnace by the shortest and most direct course it can find. The ventilating current is then diverted out of its course, fresh air is no longer carried forward to the workings in advance of this point, the atmosphere of the mine gets vitiated, and gradually becomes fiery and inflammable from the accumulation of fire-damp in the working faces, and the miners meanwhile, being unaware of any negligence, and trusting to the usual supposed safety of the mine, are insensibly surrounded by an inflammable atmosphere, and an explosion is inevitable. Double doors, whether self-acting or kept by trappers, should invariably be fitted in the air course and main drawing roads, especially where there is frequent passing. These doors are never both open at the same time, but are arranged so as to open and close alternately, the one shutting before the other opens, and thus acting as a guard upon each other. In well conducted mines, and especially in those of a fiery nature, where working with naked lights is considered precarious, the air course and drawing roads are guarded with a set of three doors, thus rendering accidents from leakage or waste of fresh air at this point almost impossible; were this the prevailing custom, loss of life from explosions of fire-damp would be of much rarer occurrence.

Explosions of fire-damp frequently occur from another cause, even with an abundant supply of pure air, and a powerful ventilating current in the air course. This is the case when a heading or drift has been driven so far in advance of the air course, that the end or face of it is out of reach of the current. In coal-seams, where firedamp is given off in great abundance, it is found necessary in excavating a heading or drift, to carry up a little fresh air to ventilate it, whenever the end or face of it is considered beyond reach of the current. This is done by fitting in a brattice of loose boards in the heading, the boards being laid on their edges from the pavement to the roof, dividing the heading into two sections, a scale of air being taken up the one side of the brattice to air the face, and then returned down the other side into the air course as before. Special attention should be paid to this where the strata are much inclined to the horizon, as the carburetted hydrogen being specifically lighter than common air, naturally floats uppermost, and gradually rising to the highest point, ultimately accumulates in the end of the heading, and unless air be taken up to dilute it, has no tendency of itself to come down to the air course to be carried off. Explosions of a trifling nature, and attended with little loss of life, occur very frequently in these headings, and extend no farther than the air course, being there met and extinguished with fresh air; but should the air current, after travelling along a series of working faces, be so far vitiated as of itself to be also inflammable, an explosion, even of a comparatively trivial kind, is attended with the most disastrous results, as the fire in such a case is taken up by the current, and communicated to the atmosphere of the whole mine.

Loss of life from explosions of fire-damp may be divided into two classes; first, death caused directly by scorching, and the violence of the explosion; and secondly, death by suffocation from choke-damp. The result of some of these explosions is most disastrous; when ignited at any point the flame instantly spreads itself throughout the workings in the neighbourhood, and that portion of the mine becomes a mass of living fire. So intense is the heat produced that the timber is generally all destroyed, and sometimes the pillars of coal are found to be charred to the depth of several inches. The dross, rubbish, and small particles of coal produced from the workings become ignited, and the enormous expansion of the air from such a high temperature drives every thing before it, doors, brattices, props, loose masses of coal, together with any unfortunate miners that may be within its influence, are carried out with irresistible force through the air course or drawing roads towards the shaft, the only outlet where the explosion can expend itself. The carbonic-acid gas or choke-damp, which is produced in great volume from the previous combustion, is drawn back again into the mine to fill up the vacuum caused by the expansion, and envelopes the miners, so that those who escape the violence of a scorching fire perish from suffocation; as in almost every case when only one shaft is sunk the brattice is destroyed, and any attempt to restore the ventilation in time to save the men is rendered hopeless. This is, perhaps, one of the strongest arguments in favour of double shafts, now so common in the North of England. The wooden brattice in a single shaft being constantly getting out of order, from moisture and its proximity to the furnace, never, even when in the best condition, perfectly isolates the one shaft from the other; neither can it ever be so air-tight as when two distinct shafts are used, where the mass of earth betwixt them becomes a natural brattice, and also when an explosion does occur is of sufficient strength to withstand the shock, so that the ventilation can be restored in a comparatively short time, and the means of raising the miners to the surface still remain available.

From what has been advanced it will be plain that, under the present system of ventilation by rarefaction, the safety of a mine depends on a powerful furnace, a capacious air-course, the headings well bratticed, and an ample ventilating current.

It is to be regretted that, at the present day, when loss of life from explosions of fire-damp is so very frequent, so much dependence should still be placed on natural ventilation. This system is at once feeble, variable, and uncertain in its action. Instead of being urged on by a vigorous furnace, the ventilating current is caused by, and merely dependent on, the excess of temperature that may chance to be in the one shaft above that in the other, so that the current throughout the mine cannot be otherwise than weak, sluggish, and totally insufficient for the purpose intended. It is well known that the ventilation of any mine, even on the most approved system, is frequently materially affected by any change in the temperature of the external atmosphere. In summer, ventilation, even under the most favourable circumstances, is never so perfect as it is in winter, from the fact that the temperature of the atmosphere approaches nearer to that of the mine in summer than it does in winter. The natural ventilating current in a mine unassisted by a furnace, is so feeble as to be most materially affected by any such change of temperature, causing the air in the mine that should otherwise be circulating briskly, to be stagnant and utterly dead. So imperfect is the ventilation in such cases, that upon any sudden change of wind or temperature, the current is sometimes completely reversed, so that what was formerly the upcast-shaft, now becomes the downcast, and the return or vitiated air is drawn back again into the workings, as intake or fresh air. This being a circumstance over which no one has control, the ventilation of the mine is for the time destroyed, and any trifling current that may be generated is wholly dependent on the air in any of the shafts assuming a higher temperature than that in the other. Under a system of ventilation so very imperfect, it is not to be wondered at that accidents from explosions, and those of the most appalling kind, should occur. Until this system is entirely abolished, loss of life must continue, and the proprietors and managers of such collieries be, in a great measure, culpable.

A contracted or otherwise insufficient air-course is also the cause of much defective ventilation. In all mines, the air-course should be distinct and apart by itself, well kept, and of sufficient area to admit of the passing of a copious column of air for any emergency, as it too frequently happens that the current is no more than adequate for the ordinary ventilation of the mine; so that when any sudden discharge of gas is given off, explosions take place, the pure air not being in sufficient volume to dilute and carry off the gas. In collieries where drawing-roads are made to serve the purpose of the air-course, the current is much impeded by the transit of the produce of the mine towards the bottom of the shaft, and also by the miners carelessly leaving their empty hutches in the drawing-roads or air-course.

A very decided improvement in the system of ventilation is now being pretty generally adopted in the northern districts of England. This consists in working the mine in isolated districts, and splitting the in-take air into several distinct columns at the bottom of the downcast shaft, and appropriating one separate column to each district. By this means the faces are aired more perfectly, each current has a much shorter course to travel, the tendency to leakage is less, and the return air is not so much charged with fire-damp; admitting of a freer use of naked lights than when the air is brought round the faces in one undivided column, and also, when an explosion does occur, it is generally confined to the district in which the gas has been ignited.

It is to be feared, however, that even under the most approved system of ventilation at present adopted, accidents from explosions of fire-damp in mines and collieries can never be entirely averted: this must exceed the hopes of the most sanguine. Circumstances unforeseen, and over which no one can have control, will at times defeat the most vigilant and judicious management; but much may, and still requires to be done, to prevent these most disastrous accidents It is at the same time both difficult and dangerous to lay down any fixed law or system to be adhered to in ventilating collieries generally. This must be left to the judgment of an intelligent and experienced manager, thoroughly conversant with the principles of ventilation; as a system that would work satisfactorily in one mine or colliery might be wholly impracticable in another. The method of splitting the air and working in districts, however, is certainly a great step in advance, and is at present the most perfect system of ventilation known. If carried out judiciously, and with a rigorous discipline, ordinary caution on the part of the miners will be a sufficient safeguard against explosions, and will, if it do not wholly avert, at least greatly tend to lessen, the number of such direful calamities.

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MR. VARLEY observed that one of the Society's volumes contained the details of a plan of colliery ventilation, for which they had awarded one hundred guineas, and a gold medal to Mr. Ryan. He suggested that the model illustrating this plan should be exhibited in conjunction with Mr. Blackwood's model, and recommended that a prize should be offered with a view to the testing of Mr. Ryan's plan, and obtaining practical results. He then proceeded to describe the plan to which he referred, the chief peculiarity of which was the use of pipes from the upper portion of the seam for the purpose of carrying off the light carburetted hydrogen gas.

**Mr. Blackwell** remarked that this plan was only applicable to collieries where the seams were much thicker than those common in this country. There was one point in regard to colliery accidents that was generally overlooked; they were often attributed to secondary instead of primary causes. It was common to trace each particular accident to some special carelessness of the workmen engaged at the time; whereas, in point of fact, this was only the exciting or secondary cause; the real and primary cause being the bad condition of the mine, which admitted of a casual act of carelessness leading to an explosion. The leaving open of a door, the taking off the top of a lamp, or some equally trivial act, was generally regarded as the cause of an explosion. It was, however, nothing of the sort. These things were sure to occur continually; and it was therefore to the general condition of the mine that consideration should be mainly directed, as it was only when the general ventilation was defective that these every-day occurrences could issue in accidents. There were two modes in which explosions in mines could be prevented: the first was by complete ventilation; the second, by the use of the Davy Lamp; and he regretted to say that the latter had not been adopted in this country to any extent. Neither ventilation nor the use of the "Davy" were alone sufficient; both should be used in order to secure safety. He believed, from extensive knowledge of the subject, that not a single instance of explosion had occurred that had originated in the use of a Davy Lamp. Much might be done by improved ventilation; but under the very best arrangements of this kind, circumstances would occur, in an unforeseen manner, in which the air would be overcharged with explosive gas, and unless the "Davy" were also used, accidents would inevitably follow. This was the case in the explosion in the Bentham seam, at Jarrow; for although the ventilation was well managed, it so happened that the seam having only been a short time opened gas accumulated, and a naked light being used instead of a "Davy," an explosion occurred, by which 100 lives were lost. In May last he was sent by Government into South Wales to inquire into a colliery accident. On a previous occasion when he had visited the mine, he had told the proprietor that unless the Davy Lamp were adopted they would most certainly have another explosion; they did not adopt it, and nine months had not elapsed before another explosion occurred, by which sixty-five lives were lost. Many similar cases might be cited if it were necessary. In regard to general ventilation, much improvement had of late years taken place, especially in Northumberland and Durham; and although there was far more coal worked there than in any other coal-field in England, there were fewer accidents, the greater number of explosions occurring in Yorkshire and South Wales, where less attention was given to ventilation. Of course no one system was of universal application; as different districts possessing different circumstances, required different plans; but if the same attention were given to the subject in other places as had been given in Northumberland, fewer accidents would occur. The amelioration which had there taken place, in dividing the current of air at the bottom of the shaft, and causing it to pass into different districts, shortening the length of the circuit, and reducing the number of doors, and keeping up large furnaces, had almost removed explosions from defective ventilation in that district. Still, however good ventilation might be, it was not the less necessary to insist on the use of the "Davy." He knew that there was a prejudice against it amongst colliers; the old one with the wire gauze did give a bad light, but there were modifications of it not open to the same objection. He approved of the glass lamps, as he thought they afforded sufficient security, and no objection could be made to the light given by them. In Belgium, nothing else was used; there the miners would not work on any consideration with naked lights, and until safety lamps were universally used in England, we must expect to have more or less explosions.

The **Chairman** asked Mr. Blackwell which of the varieties of the Davy Lamp he considered the safest and most effective.

**Mr. Blackwell** said, that for going into an atmosphere of an explosive or doubtful kind, for the purpose of testing, the Davy Lamp, as left by Sir Humphrey Davy, was the most delicate instrument. But for ordinary purposes the glass lamps commonly used in Belgium, were, he thought, the most useful. There was a modification of the solar lamp applied to the same purpose, which gave an excellent light.

**Mr. Ikey** said, it had been long admitted that the Davy Lamp was no safety lamp at all, because when hydrogen gas was present, it could get through the wires and ignite. Although of late years there had been much improvement in colliery ventilation, especially in Northumberland, still there were very many explosions. He had recently submitted a plan to the Institute of Mining Engineers, at Newcastle, for exploding the foul gas by means of gunpowder, before the miners entered the pit; he proposed to do this by the aid of electricity, and to have it repeated every twelve hours, or oftener; the effect would be to remove a portion of the hydrogen, and so keep the air below the explosive point as effectually as by increased admission of atmospheric air. He had received a letter from the chairman of the Institute, who was going to have the experiment tried.

**Mr. Blackwell** said the last gentleman misunderstood him if he thought he depreciated the importance of ventilation; but he must still insist on the necessity of using the "Davy." He thought it was only fair to ask that gentleman if he could point to a single instance in which a colliery explosion had occurred in which the Davy Lamps had been exclusively used, under proper regulations? He (Mr. Blackwell) knew something of these things, and did not remember one. There was but one disputed case,—that of the explosion at the Haswell Colliery; and in reference to that, evidence was tendered before the House of Lords, to the effect that the explosion did not result from the use of a Davy Lamp. Hundreds and thousands were daily going into explosive atmospheres with this lamp; he had done so himself, and knew of no accident.

**Mr. Warrington Smyth** could not claim to have so intimate an acquaintance with the subject as Mr. Blackwell, but having had some experience in connection with several collieries, he would make a few remarks. The paper which had been read presented a very fair sketch of the subject, but a sketch that would be very imperfect without the addition of a large number of notes. The author of the paper appeared to have been describing the state of the collieries in the north thirty or forty years ago, before the improvements had been commenced. When he spoke of collieries having only one shaft divided down the centre by a brattice, so that one portion might be used as the upcast, and the other as the downcast shaft, he referred to a thing that was beginning to be very uncommon indeed. The length of the air-courses, also, which used to be about thirty or forty miles in extent, was now much reduced; and the system of splitting the current of air, and making it traverse shorter circuits, was now commonly adopted. He fully coincided with Mr. Blackwell in his remarks as to the use of the "Davy." In all collieries there were some portions of the workings much more dangerous than others, and it was frequently the custom to have these dangerous parts separated from the rest of the mine by doors, which were guarded by persons who had strict instructions to suffer no one to enter with a naked light. Where this was done, explosions never occurred. But in others the discipline was more lax, no rules or regulations were observed, and explosions were not uncommon. In the northern collieries, where the subject of ventilation, both theoretically and practically, had occupied the attention of such names as Mr. Potter, and Mr. Nicholas Wood, explosions seldom occurred. In reference to the idea of ventilating a coal-mine by means of pipes at the upper part of the shaft, he was surprised that any one should recommend such a plan, when it was known that the air-courses were required to be of great area, and that large bodies of air were continually traversing through them. The author of the Paper threw a little too much blame on those collieries which were left to natural ventilation; as, during a great part of the year, it was a very powerful means of ventilation, especially when the two shafts were of different depths. In confirmation of this, he referred to an experiment, at which he was present, made by Mr. Nicholas Wood, who was trying the relative advantages of the steam-jet and a furnace; and they found that the natural ventilation alone, without the aid of either, gave a current of as much as from 10,000 to 11,000 cubic feet of air per minute. It was manifest, however, since circumstances varied so much in each mine, success could only be secured by the careful judgment and enterprise of the respective managers of the collieries; and any one who read the voluminous reports from the Mining Institute of the North would see how much was being done to improve the condition of the mines there, and he trusted the results of such efforts would spread throughout all the colliery districts in the kingdom.

**Mr. Edward Simons**, of Birmingham, exhibited and explained two improved safety-lamps. The first was the common "Davy," with the addition of a self-acting extinguisher, which served also as a reflector. When a miner attempted to uncover his lamp for the purpose of obtaining more light, or for lighting his pipe, the extinguisher was immediately brought into action, and put out the light. The second lamp also possessed this self-acting extinguisher, with the addition of several other improvements, by which a brilliant light and perfect safety were combined. He regretted that several colliery-owners who had seen them, although they admired them much, made the extra expense an objection; but he thought the difference between 5*s*. or 7*s*. and 15*s*. ought not to be weighed against human life. He expressed his readiness if, on trial, they were found as effective as he believed they would be, to give up his patent right, and throw their manufacture open to public competition, so as to bring them to the lowest possible price. This announcement was received with much applause.

The **Chairman** expressed the thanks of the meeting to Mr. Simons for such a liberal offer. He felt a deep interest in the subject, and had taken some pains to promote the proper regulation of mines. Four or five years ago he obtained a Committee in the House of Lords, who sat in 1849, and collected some valuable information, which had led to increased attention to the subject. It had the very satisfactory result of enabling them to press the Government to take steps for the establishment of inspectors to ascertain the actual condition of the mines in different parts of the country. Soon after that an Act was passed for the appointment of inspectors, which had had a very beneficial effect, the only drawback being that the inspection was not quite extensive enough. Many objections had been urged against allowing the inspectors power to enforce any particular mode of ventilation, as it was impossible for them to possess the knowledge of the circumstances of each colliery—the depth, thickness, dip, quality, &c., &c.—so well as the resident managers. Another objection to such a power would arise from the fact that it would be transferring the responsibility from the proper parties. The inspection had done this especial good, it had called attention to persons who were careless, and it had helped to spread the best information throughout the country, and he trusted that the result of the awakened and continued attention to the subject would be a decrease in the very lamentable accidents from colliery explosions. He concluded by moving a vote of thanks to Mr. Blackwood for his interesting paper.

**Mr. Winkworth** proposed a vote of thanks to his Lordship for his able conduct in the Chair, which was duly passed and acknowledged.

It was announced that, at the next meeting, on April 20th, two papers would be read, the first by Messrs. Mordan, "On Mr. Denison's New Lock;" and the second, by Mr. W. H Tucker, of Tiverton, "On a New Improved Lock."

## PHOTOGRAPHIC INSTRUMENTS.

Photography may fairly be said to have broken upon the world without an introduction. The means of obtaining photographic pictures, although greatly improved in so far as chemistry is concerned, are yet so far deficient as that the camera itself and the principles of its construction have been but slightly modified. The art has, with few exceptions, been practised only by amateurs, the cameras employed being little else than oblong square boxes, with a single lens at one extremity; and each practitioner has worked in ignorance of what others were doing. The camera to this day, although introduced into England in 1839, is, so far as the general public is concerned, a thing unknown. Such was proved to be the fact, by the Exhibition of Photography held at Christmas last; the almost universal inquiry being, How are these pictures obtained? and resulting in a request that the Council of the Society of Arts would cause a collection of the instruments and materials employed to be made and exhibited.

The collection of cameras now open to Members and their friends, illustrates all the most recent and improved principles of construction, and suggestions for the use of new materials and combinations by which their efficiency, portability, and extent of application may be increased, at the same time that their cost is diminished.

The cameras included in the collection are contributed by Messrs. Archer, Claudet, P. De la Motte, G. Edwards, P. W. Fry, Henneman, Highley, jun., Horne, Thornthwaite, and Wood, Knight and Sons, W. E. and F. Newton, Professor Maskelyne, M. Swann, &c., and divide themselves into three classes; namely, the Box, the Folding or Portable, and the Operative Camera, or Camera in which, or in connection with which, the chemical portion of the art may be performed

Of the cameras exhibited, those by Messrs. Henneman, Horne, Thornthwaite, and Wood, and Messrs. Knight and Son, are in most general use, and are constructed so as to afford facilities for increasing or decreasing the focal length of the camera by constructing the box upon the telescopic principle; that by Mr. Henneman has also a revolving and double-adjusting disc in which the lens is placed, and by means of which the upper portion of a building, not previously in the field of view, can (without altering the focus of the camera), be adjusted.

Of the three cameras exhibited by Messrs. Knight and Son, that of the most novel construction is on a combined principle, being adapted for long or short-focused lenses, being fitted with a Voigtlander lens, No. 3, which can be used in combination for portraits or groups, or the front lens can be used singly for views, producing a well-defined picture eleven inches in width. The camera is portable, being constructed to pack in a portmanteau. The greatest length of the camera is employed with the single lens, for taking views; but to adapt it for the lenses, when used in combination, the front end is taken out, and a portion of the top and sides fold down, when the front end is again replaced with the combined lenses, and it is ready to be operated with.

Of the second class, or Folding Cameras, those invented by Mr. Edwards and Mr. Stokes (the latter exhibited by Mr. De la Motte) are on the most novel principles, the body of the cameras being made of black cloth or waterproof materials, impervious to light; each is capable of being packed into a very small space, and the latter has a wooden frame, affording great facilities for carrying a large quantity of prepared paper at the back of the camera, and for changing it without subjecting it to the action of the light; while that by Mr. Edwards is constructed entirely of metal, covered with "cording," or waterproof cloth, and has perfect rigidity of parts. The foundation of this instrument is a brass tube 1¼ in. diameter, the centre of which screws on to a ball and socket joint, which terminates in the stand. On one end of the tube is a light frame of brass, merely sufficient to receive the plate-box; at the other end is a small frame to hold the lens, fixed on a slide for adjusting the focus. Four wires, which can be firmly clamped, extend from one frame to the other, and keep the covering material in its proper shape; a diaphragm in advance of the lens has its shade tube formed also of "cording." The wires when withdrawn pack in the tube, and the small end with the covering, packs in the larger end. The total bulk is 4 cubic inches to each square inch of picture, and the weight 1¼ oz. to the same area of picture, being 76 per cent. of the area of the largest end of the camera; these results would be still more favourable in large cameras. A looking-glass to show the picture erect, enables the legs to be short and the curtain small.

In the class of Portable Cameras must be included that of Professor Maskelyne. It is an ordinary oblong box, with telescopic adjustment for focusing, which operation is performed within and from the back of the camera. This also affords considerable facilities for carrying a quantity of prepared paper, which being placed in a box packs in the camera, while a second box containing the chemicals necessary for developing the picture, also packs within the camera. A third box, containing brushes and the other implements and materials, is placed on the top. The lens is capable of a vertical adjustment after the focus has been set, affording facilities for cutting off, or increasing, the foreground of the picture. The whole apparatus, with a tent or screen, packs into a Mackintosh cover.

The third class of cameras exhibited are those adapted to the Colodion process, which, owing to its extremely rapid action, requires to be carried on during the development of the picture, in a dark chamber. Cameras in this class are exhibited by Mr. Archer, and Messrs. W. E. and F. Newton. In the former case, the frame of the camera is long enough to afford, when covered with waterproof cloth, sufficient room within the camera for carrying on the different processes of development; while in the camera by Messrs. Newton, a series of baths are placed, either within or below the camera, and the glass or plate to be operated upon is attached to a moveable vertical rod sliding through a socket fixed to a graduated bar, and by the combined action of which the plate may be brought over, and immersed in, any required solution without exposure to the action of light.

The camera exhibited by M. Claudet, is constructed with two racks and pinions at right angles to each other, for giving motion to the focusing plate, enabling it to be so adjusted as to admit of eight or more portraits being taken upon one plate, when it is not desirable to group them, as is usually the case in family pictures.

The camera, by Mr. S. Highley, jun., possesses three points of novelty; viz., a sliding top, to admit of the plate-holder being adjusted to a short or long focus; a tent adapted to the camera-stand; and an adjustment for microscopic object-glasses.

The collection also includes several other instruments used in the art; viz., a Focimeter, for determining the difference between the lenticular and actinic foci; a Photographometer, for measuring the power of light, or determining the relative sensitiveness of different plates; and a Dynactinometer, for determining the relative quickness of action of different lenses, by Mr. Claudet; also, printing frames, stereoscopes, &c., on many different principles of construction. The camera stands are variously constructed, so as to combine rigidity with portability. The collection will remain open till the end of the present month, and may be viewed upon the presentation of a written order, signed by a member.

## ON FIXING PHOTOGRAPHIC DRAWINGS.

We have received from an amateur, who states he has "never yet seen the productions of any other person," some calotypes, which are to a certain extent successful. They exhibit, however, many of the faults which mark the productions of the inexperienced operator; and we are therefore induced to offer a few suggestions which may be of assistance to our correspondent, and others similarly situated.

In the first place, the specimens before us bear the evidence of having been obtained with a very imperfect lens—we should judge from appearances, a lens which has not been made for a Photographic Camera. Now, the peculiar conditions of the agent by which these pictures are produced, demand the use of lenses which have been constructed with due regard to certain known principles; otherwise a perfectly flat field, and distinctness up to the edges, cannot be obtained.

It is a mistake to attempt to adopt an ordinary lens to a photographic camera; as, by so doing, failure must follow upon failure, and the production of a good photograph is rendered impossible.

Our correspondent complains of the injury which his pictures receive in the process of fixing with the hyposulphite of soda, and regrets that some more perfect method cannot be discovered.

We believe it will be difficult to discover any chemical agent superior to the hyposulphite of soda, which, when properly employed, ensures the utmost degree of permanence to the photograph under any circumstances of exposure. To place this clearly before our readers is our object.

1. The hyposulphites are remarkable for their property of dissolving several of the salts of silver—such as the chloride and iodide—forming with them compounds which are distinguished by their peculiar sweetness. *Negative* Talbotypes consist of an iodide of silver over all these parts which are not darkened; and of metallic silver in a state of minute division over the darkened portions. Positive pictures only differ from negatives in the general use of the chloride of silver, instead of the iodide. In either case the unchanged silver salt is to be removed, and the darkened portions disturbed as little as possible. In the process of change under the influence of the solar radiations, oxide of silver appears to be formed at first; the oxygen is then liberated, and metallic silver is the final result. If much oxide of silver remains on the paper, the hyposulphite of soda will dissolve some portions of it, and thus injure the picture. This is shown by the more energetic action of the hyposulphite on the positive than on the negative pictures. In the latter, by the action of the Gallic acid, or the protosulphate of iron, the complete deoxidation of the silver salt is effected. In the former, this is not the case where the exposure to sunshine has been short, or where the copy has been made by the effect of diffused daylight.

Positive photographs which are made when the sun is shining brilliantly, are far less liable to injury than such as are procured by the weak and uncertain light of a wintry day, although they may in both cases be brought to the same apparent degree of darkness.

2. As a general rule, it is advisable to expose the positive to sunshine longer than it is necessary to do, for the production of a well-defined image. If the picture has been rendered *far too dark* to be pleasant, it can be *toned* back, to use an artistic phrase, by very weak solutions of the iodide or cyanide of potassium.

3. The photograph being removed from the copying frame, or the camera, should be first placed in some clean water, to which a small quantity of common salt has been added. By this all the free nitrate of silver is converted into a chloride; and the formation of any sulphuret of silver in the paper, by the action of the nitric acid on the sulphur salt, prevented. The picture should, after it has soaked for a little time, be removed and placed in a solution of the hyposulphite of soda, in a flat dish—about an ounce of that salt being dissolved in a quart of water—it should remain in this fluid for five or ten minutes, and then be removed to a vessel of perfectly clean water.

4. It is thought by many photographers that the addition of some chloride of silver to the hyposulphite of soda prevents its acting on the more delicate shadows of the picture. Whether this is the case or not is somewhat uncertain; but the hyposulphite solution can be used a great many times, if after using it is poured back into a bottle, and kept from the air.

5. It becomes necessary now to remove every trace of the hyposulphite of soda and silver from the paper. Many persons are content with soaking their pictures; but by far the best practice is, to place the photographs upon a flat board, incline it to an angle of about 45°, and allow water slowly to fall upon and flow off from the pictures. By this means the salt is removed far more rapidly than by soaking and changing the water, howsoever carefully this may be done. Even after this the safest course is, to place the photograph in some clean hot water, to which a little potash has been added. This secures the removal of the last trace of the hyposulphite, and it darkens again those lines in the photograph which may have been injured by chemical action, as above described.

6. By attention to these details photographs may be fixed most permanently, without their undergoing any serious injury. The addition of neutral chloride of gold to the hyposulphite of soda bath, tends to produce a variety of purples approaching almost to black, which are of a very pleasing character. Similar results may be obtained by soaking the picture in a weak solution of the chloride of gold, upon removing it from the fixing fluids.

7. The experience derived from the photographs displayed at our late Photographic Exhibition, some of which have since been presented to the Society, convinces us that sufficient care is not generally given to secure the perfect permanence of a fine positive photograph. By the combined influence of a moist atmosphere and light, changes slowly go on from the edges of the paper spreading inwards, which eventually destroy the picture, if there is the slightest trace of the hyposulphite of silver allowed to remain on the paper. The taste is the best test that we can apply; and if after a picture has been well washed in several perfectly clean waters, we take one corner of it into the mouth and suck out some of the water, without discovering any metallic sweetness, we may be sure that our photograph will endure as long as any ordinary print.

## TAXES ON KNOWLEDGE.

In the House of Commons, on Thursday evening, Mr. Milner Gibson called the attention of the House to the following Resolutions:

1. That the Advertisement Duty ought to be repealed.

2. That the policy of restraining the cheap periodical press from narrating current events, by rendering it liable to stamp duties and other restrictions, if "any public news, intelligence, or occurrences, or any remarks or any observations thereon" be contained therein, is inexpedient, and at variance with the desire now generally expressed in favour of the diffusion of knowledge amongst all classes: and it appears also to this House, that the law relative to taxes on newspapers, and other regulations affecting public prints, is in an unsatisfactory state, and demands the attention of Parliament.

3. That the Excise duty on paper, whilst impeding the development of an important manufacture, also materially obstructs the production of good cheap literature and the maintenance of this tax as a permanent source of revenue would be impolitic and inconsistent with the efforts which Parliament is now making to promote education amongst the great body of the people.

A debate ensued, in which the resolutions were seconded by Mr. Ewart, and supported by Mr. Bright, Mr. Disraeli, Mr. Cobden, Mr. J. L. Ricardo, Mr. J. M'Gregor, Sir J. Pakington, and others; and opposed by the Chancellor of the Exchequer, Lord J. Russell, Mr. Sidney Herbert, and Lord Robert Grosvenor. On a division, the proposal to repeal the Advertisement Duty was carried by a majority of 31; that to repeal the Stamp Duty was rejected by a majority of 182; and that to repeal the Paper Duty was rejected by a majority of 195.

## APPLICATION OF THE PARLIAMENTARY GRANTS IN AID OF INSTRUCTION IN ART, FOR THE YEAR 1853-4.

THE following important Minute has just been issued by the Board of Trade:

My Lords take into consideration the estimates about to be submitted to Parliament for affording aid to the Local Schools of Art, during the year ending 31st March, 1854.

At the establishment of the Schools, it was understood that a Government grant was promised for a limited period of three years, upon the condition that a sum equivalent to it was raised in the locality, and, in the expectation that after three years the Schools would be so established and supported as not to require any further assistance from Government. These expectations have not been fulfilled; but, on the contrary, the tendency of the system, until very lately, has been to encourage increased reliance on Government aid, rather than upon the value of the instruction or local exertions, and has been found adverse to economy. My Lords are of opinion that by more judicious arrangements, it may be possible greatly to increase the advantages which now result from the outlay of so large a sum of public money; and while they do not propose to withdraw grants from the places which now receive them, they are desirous to introduce a system of greater efficiency and economy, by which the independence of the local bodies may be increased, and the objects of the Parliamentary Vote more adequately attained. My Lords desire to relieve the localities altogether from the obligation to raise a sum equivalent to the Parliamentary Vote, and instead, to leave the whole general management, and the control of the cost of it, entirely to the Local Committees. In future, the Local Committees will not be required to return to this Board any account of their local expenditure, or of any receipts from subscriptions or donations; each Local Committee will therefore determine for itself what premises shall be used—subject, of course, to their being considered by My Lords as suitable for the purposes of instruction;—what rent shall be paid, what furniture provided, what managing officers, servants, &c., shall be engaged, and what shall be the cost of general management.

My Lords, on their part, propose to confine the Parliamentary Grants wholly to the promotion of instruction, and even in this point to exercise control only so long as the Local Committee elects to receive the parliamentary aid. Their Lordships would view it as the highest mark of the progress and success of art education, in any locality, to find that the Committee preferred independence of the Government Grant altogether.

My Lords will require that the Parliamentary Grant for the year ending 31st March, 1854, should be paid to the following objects: the present masters' salaries; an increase of masters where necessary, especially for affording instruction to public schools; pupil teachers; and to deserving students in holding scholarships, both in local and metropolitan schools, and to students in training to become masters; lectures, and examples for teaching. After communication with the Local Committees, My Lords will apportion the Grant to these respective items.

As the fees paid by the students may be considered as the product, partly, of the Grants furnished by Parliament, and partly of the funds raised in the locality, My Lords will require, as a condition of receiving any parliamentary aid, that an equitable portion of the fees shall be applied towards instruction, and in accordance with their Minute of the 28th January, 1853, and for the reasons given in the letter of the 30th June, 1852, which has been sanctioned by the Lords Commissioners of Her Majesty's Treasury, they propose that such portion of the fees shall be paid to the master or masters of the school, as part of their income.

HENRY COLE, *Secretary*.

## HOME CORRESPONDENCE.

### DUTIES ON PAPER, NEWS, ETC.

Chalcots, Hampstead, April 6, 1853.

SIR,—In answer to your inquiry, and in compliance with your request, I can have no hesitation in expressing the conviction to which I have been brought by painful experience, regarding the paper duties; namely, that they operate powerfully in checking the progress of popular literature, and consequently in obstructing the otherwise untrammelled, and only untrammelled, means of education which exists in this country. I cannot believe that anything but want of knowledge of the operation of the paper duties could allow any man to speak of their pressure as trifling and inappreciable. Such would be the case if only expensive books were published. As the case actually stands, our literature having undergone a great revolution, so as to make cheap books the rule and dear books the exception, the pressure of this tax is so severe as absolutely to prevent publications from taking place which otherwise would see the light. If any gentleman accustomed to speak of it as a trifle were present at one of the business councils which occasionally take place at the printing-office in Edinburgh with which I am connected, and heard how fractions in the price of paper, far within the limits of this tax, told in encouraging and discouraging plans of cheap periodicals designed for the instruction and innocent entertainment of the people, and reflected how every such work of pure character is so much deducted from the means and temptations of corruption,—and every failure or withdrawal of such works is in reality the yielding of a piece of ground to the devil,—he would come to think of this treasured piece of the Chancellor of the Exchequer's possessions in a different light from what he has been accustomed to. One would have thought that the business of literature, so noted in all times for its struggles and its sufferings, and yet conferring such large benefits on mankind, would have been deemed sacred in so enlightened a country as this from fiscal oppression, while a single other article of common use remained untaxed. One would have expected at least to find all journalists unanimous in arguing for its exemption. That such is not the case can only, I think, be attributed to some secret sensitiveness in a portion of the press regarding the associated question of the newspaper stamp. I am therefore glad to find that a disposition now exists in some quarters to separate the one question from the other, and plead for the abolition of the paper duties alone. I believe that the dismissal of the stamp would also be favourable to the education of the people; but I must admit that there are some arguments of considerable force for its being retained; and, any how, we should be in a more hopeful position for attaining the *unmixed good* of an abolition of the paper tax, if we were quit of that semi-political question.

You are doubtless aware of the many strong arguments that have been brought forward in favour of th abolition of the advertisement duty. There is one to which I would fain draw attention, as the interests of literature are much concerned in it. It consists in a simple fact which I took all possible care to ascertain; namely, that the poor trade of authorcraft pays annually, in the form of duty on book advertisements in newspapers, the large sum of *twenty thousand pounds!* Contrast with this the encouragement which it gets from the State!

I am,
Yours very faithfully,
R. Chambers.

## COMMUNICATION BETWEEN GUARDS AND ENGINE-DRIVERS.

Sir,—Mr. Francis Whishaw, in the Journal of the Society, No. XI., calls attention to a plan he recommended some thirteen years ago, as adopted on the Brighton Railway. In the following Number of the Journal you were pleased to give the public the benefit of my "reflection" by appending it to Mr. Francis Whishaw's simple and effectual contrivance of the bell, by which when the guard or driver could not *hear*, they would *see*. In No. XIX. you have very fairly given the result of the "Conclave of the Board of Delegates from the Railway Clearing-house" (and which also occupied some column and a half of the *Times*), stating, "no signals depending on sight or distant sound, or on complex contrivances of any kind, can be so adapted to make the communication at all times certain," and therefore advise a mode "which must have the quality of simplicity of construction." Your readers need only follow the remarks of "Inquirer" (in the same Number), to determine for themselves and the public "the crude and ill-considered scheme," as "Inquirer" terms it, as to simplicity and certainty of action. Although I do not admire "Inquirer's" allusion of "*esprit de corps*," &c. Gentlemen may be mistaken; but I am certain you, Sir, will agree with me, that those constituting the Board of Delegates could only be actuated by very different considerations. However, permit me to make one or two remarks upon the conclusion to which the Board of Delegates arrived. As to "signals depending on sight not being at all times certain," I am certain that you, as well as the public, will agree with me, if signals depending on sight should be perfect for three hundred days out of the three hundred and sixty-five in the year, it would be a lamentable dereliction of duty on the part of any Board or Legislators to prevent the safety so far to the travelling community. By the means recommended by Mr. Whishaw and myself, you can not only communicate at *all* times, and enable the guard and engine-driver to *hear* as well as *see*, but in almost every case you can at the same time *tell* them what each requires; and the only instance where the bell is preferable is in a fog. By night, or in a tunnel (except in a fog), the coloured lights would indicate, without the use of the bell, whether the driver was to stop or go cautiously, and the white light that all was right, without the necessity of the driver leaving his seat; and by daylight, the reflection in the looking-glass, the usual signal from the guard, holding up the right or left arm, or both, would perform the same duty, which would be immediately seen by the engine-driver. To add to the safety of the public, there should always be *two* guards; one in the rear of the train, with a powerful brake, carriage, or van,—the brake acting upon the rails, and not upon the wheels of the carriage; and another guard in the centre of the train, sitting sideways in his box, the part of which is elevated (above the roofs of the carriages). Two other looking-glasses should be placed immediately in front of him, each at an angle of 45°, by which he could at all times see what was passing, either in front or in the rear of the train. These suggestions followed out, the cost of which would entail but the outlay of a few shillings, would perform nearly all the duties desired. The attachment to the bell must not be by *gutta percha*, but by a stout wire over the tops of the carriages, with a short length of chain to either end, with a *clasp-hook*, permitting the coupling between each carriage, as it is now universally practised through out the kingdom.

I am,
Yours very truly,
John Braithwaite.

## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Royal Institution, April 4th.—At the General Monthly Meeting, W. Pole, Esq., F.R.S., Treasurer and Vice-president, in the chair, Sir J. Matheson, Bart., M.P., F.R.S.; W. Bigg, Esq.; P. Carther, Esq.; M. Leake, Esq.; W. Pinney, Esq., M.P.; and J. White, Esq., were elected members.

Royal Geographical Society. April 11.—Sir Roderick I. Murchison, F.R.S., President, in the chair. A paper on "Oceanic Currents, and their influence on the Central American Canal," by Alex. G. Findlay, Esq., F.R.G.S., was read. After a brief reference to the progress of the subject of currents from its origin, by Major Rennell, in 1778, to the publication of his "Investigation," published in 1832, the author proceeded to point out some deficiences in the system as then established, and showed that the waters of the Atlantic circulated around a space having the parallel of 30° N. as its axis; that a portion of the Gulf-stream flows to the N.E., and ameliorates the climate of the British islands and Norway, without which influence they would be assimilated to Labrador and Greenland. The peculiarities of the Gulf-stream recently elicited were described; a nearly perpendicular wall of warm water in juxta-position with the cold Arctic waters flowing southward, between it and the coast of the United States, and another and parallel branch to the S.E. of it was noticed. The somewhat similar arrangement in the South Atlantic was alluded to, of a current revolution around the parallel of 30° S. The anomalous character of the Guinea current was cleared up by an analogous current in the Pacific, not hitherto noticed. This portion of the subject was illustrated by a large diagram, in which the currents and their polar or tropical origin were very clearly marked. In describing the currents of the Pacific, the subject was a new one, and, at least, two currents of very great magnitude had not yet been noticed, or only indirectly hinted at. A very large engraved chart contained the data. It was shown that the waters from the antarctic pole flowed slowly northward and eastward, towards the lat. of 28° N.; that a portion of these cold waters struck the west coast of South America, or about the parallel of 40° S., and dividing, one branch flowed south and east, forming the eastern Cape Horn current; and the other ascending the coast, as a remarkably cold stream, was called the Peruvian or Humboldt's current; reaching to near the American isthmus, it turned past the Galápagos islands, where many singular effects were produced, but that at times a portion continued northward and flowed on to Panama. The Peruvian current flows on westward, and forms the initial course of the great southern equatorial current, between 40° N., and 26° S., which, passing the Pacific archipelagoes, has many anomalies, but a portion striking the coast of Australia has a precise relation to the Brazil current in the South Atlantic, and circulates around the space between Australia and New Zealand. The North Equatorial Current is not well defined at its eastern end, but flows strongly towards the Philippine Islands, across the ocean between 10° and 24° N. lat., whence it turns northward towards the coast of Japan. It then forms the impetus to a current not found on physical charts, and which was here named the Japanese Current, from its analogous relation to Florida and the Atlantic Gulf Stream. This Gulf Stream of the Pacific was then traced by direct observation and inference, from numerous authorities who were quoted, across the entire breadth of the Pacific, to the N.W. coast of America. Its effect on the climate of Sitka and Prince William's Sound were shown to be similar to that on the coast of Norway. The temperature and the wrecks of Japanese junks, the drift of timber to the Sandwich Islands, &c., proved the circulation of the waters around the lat. 30°, to be the same as in the other thermal systems described. The ocean waters flow southward, down the American coast toward the Bay of Panama, or the Great Bight, formed by the American Isthmus; and the new and very important current was then described, and the numerous authorities on which it might be established were quoted. It is a zone of *easterly* drift, between lat. 50° and 60° N., extending all across the Pacific, from the Pellew Islands nearly to the Bay of Panama, and was named the Equinoctial Counter Current. This singular current has an exact relationship to the Guinea Current, on the opposite side. The origin of this was supposed to be due to the action of the N.N.E. and S.E. trade winds, which, forcing the waters up to these latitudes, caused them to reverse their normal action; and thus the waters appear all to flow toward that one point, of such great interest at the present time. The navigation about Panama was shown to be very critical and difficult. Respecting the question of the level of the two oceans, if it were not for the counter current it might be reasonably supposed that the Atlantic would be several feet higher than the Pacific, from the waters in each ocean being drifted to their western sides, but which are thus almost exactly balanced. After some complimentary remarks from the President, the meeting was adjourned.

## PROCEEDINGS OF INSTITUTIONS.

ALTON.—Recently a lecture was delivered at the Mechanics' Institute, on "The Scenery of the Pyrenees," by Mr. C. James, of Cambridge. The lecturer led his audience from Nismes, along the chain of the Pyrenees, to Pau, describing the chief points of interest, and the principal incidents of adventure in his route. The most striking portions of the scenery were illustrated by a set of transparent paintings—Maladetta, Mont Perdu, the Lac Bleu, and the Peak du Midi, standing out conspicuously amongst the peaks, passes, gorges, and ravines, of that romantic region.

DURHAM.—The first lecture under the auspices of the Society of Arts, was delivered in the lecture-room of the Mechanics' Institute, on Monday evening, by William Hughes, Esq., F.R.G.S.. &c., subject, "Earthquakes and Volcanoes." The lecturer said, that the subject of earthquakes and volcanoes related to the disturbing agents continually in operation, and continually modifying in various forms the external features of the earth. They were manifestations of the heated nature of the earth; because direct experiments upon the temperature of the strata of the earth, in any part of the world, showed a continually higher temperature as they descended below the surface of the earth, in the proportion of about 1° of Fahrenheit's thermometer to fifty-four feet of perpendicular descent. The phenomena under discussion might be regarded as evidence of a fluid condition of the earth's mass, owing to the intensity of heat in the internal parts of the earth, and the development of subterranean heat issuing from them; and the action of that heat upon large bodies of air imprisoned in cavernous recesses below the ground, was the proximate cause of earthquakes, in one form of action, or of eruptions of volcanoes in another—of gas below the surface of the ground, in one form of action heaving up in earthquakes whole masses of solid rock which form the earth's crust, or in the other, bursting open the crater of the volcano, and by means of that vent, discharging from the interior of the earth various forms of matter. By means of a map, the lecturer then pointed out the geographical positions of the regions most subject to earthquakes and volcanoes. There were differences, he said, in the particular modes in which earthquakes and volcanoes manifested their action. The earthquake, as its name implied, was a disturbing of the solid ground; whereas a volcano was generally truncated, and at the top was a deep hollow towards its interior. A vote of thanks to Mr. Hughes was carried by acclamation.

DARLINGTON.—The Report of the Committee for the past twelve months states that the library, news and reading-room, has been more extensively resorted to than at any previous period; four classes have been established; and a series of instructive lectures have been delivered. The present number of members is 400, showing an increase of 21 over the previous year. An addition of 211 volumes has been made to the library, making a total number of 1,818 possessed by the Institution. Since the last general meeting, the Committee have directed much attention to the new building. Contracts for its erection have been agreed to, and it is expected that in January, 1854, possession will be obtained. The entire cost will be about 2,200*l.*, the half of which amount has already been subscribed.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

"A."—A travelling porter, occupying the position recommended by our correspondent, has for some time past accompanied the express trains on the Great Western Railway, in addition to the ordinary guard.

*Erratum.*—In page 238, "Questions from Correspondents, No. 53," for "rich clothes," read "rick cloths."

## QUESTION FROM CORRESPONDENT.

*Flooring.*—"What is the most economical composition for flooring; the manner in which it may be laid down, and the expense per square foot?" [No. 55.]

## MISCELLANEA.

Colonial Postage.—The Council of the Postage Association has determined to set aside, for the present, the proposition for a Penny Colonial Postage, and to exert all its influence in inducing Ministers to adopt at once a uniform rate of *three pence* for a half-ounce letter to any of our Colonies. The Government proposition calculates a penny inland rate on each side, and fourpence for the ocean transit. This latter item the Association proposes should be reduced to one penny, thus adopting the Inland Rate proposed by Government, and the Ocean Penny Postage of Mr. Elihu Burritt. The Association has asked the Earl of Aberdeen to receive a deputation on the subject, and his Lordship has appointed Saturday, the 16th instant, at 1 o'clock. It is expected that the deputation will be very numerous and influential.

Decimal Coinage.—On Tuesday, Mr. William Brown moved for a select committee of the House of Commons, which was agreed to, to take into consideration and report to the House the practicability and advantages, or otherwise, that would arise from adopting a Decimal system of coinage. The following gentlemen are to constitute the Committee:—Mr. William Brown, Mr. Cardwell, Mr. John Ball, Mr. Tufnell, Mr. Alderman Thompson, Mr. Dunlop, Mr. Matthew Forster, Lord Stanley, Mr. Moody, Mr. Hamilton, Mr. John Benjamin Smith, Sir William Clay, the Marquis of Chandos, Sir William Jolliffe, and Mr. Kinnaird.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 6th April.*

[illegible]. Railways—Return.
261. Civil Services—Estimates, Classes 1 to 6.
262. Civil Contingencies—Account and Estimate.
264. Kaffir War (Cape of Good Hope)—Estimate.
[illegible]. Municipal Charters—Return.
[illegible]. Rochester Consistory Court, &c., and Ecclesiastical Courts—Return.
[illegible]. Brighton Municipal Charter—Report by W. Forsyth, Esq.
Australian Mints—Copy of Treasury Minute.
Australian Colonies (Alterations in the Constitutions)—Further papers.

*Delivered on 7th April.*

105 (I). Cambridge Election—Index to Minutes of Evidence.
[illegible]. Commissariats—Estimate.
[illegible]. Civil Services—Estimates, Classes 2, 3, and 4 (corrected pages).
[illegible]. Bill—Clergy Reserves, Canada (amended).
Sir James Brooke—Further papers.

*Delivered on 8th April.*

281. Commissariat Chest—Account.
282. Railways (Passengers conveyed, &c.)—Return.
283. Trade and Navigation—Accounts.
Clergy Reserves (Canada)—Further papers.

*Delivered on 9th and 11th April.*

[illegible]. Local Acts—Reports of the Admiralty.
[illegible]. Kingston-upon-Hull Election—Index to Minutes of Evidence.
[illegible]. Committee of Selection—Fifth Report.
[illegible]. Railway and Canal Bills—Fourth Report from Committee.
[illegible]. Writs of Distringas, &c.—Return.
[illegible]. Kilmainham Hospital—Papers (Reprint of No. 331 of 1834).
[illegible]. Arterial Drainage (Ireland)—Treasury minute.
[illegible]. Railway and Canal Bills—Third Report from Committee.
[illegible]. Bills—Brecon Collegiate Church.
[illegible]. " —Education.
Meteorological and Hydrophical Observations—Papers.
Department of Practical Art—First Report.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 8th April*, 1853.

*Dated 7th March.*

575. A. Carosio—Electro magnetic apparatus for motive-power, light, and heat.

*Dated 23rd March.*

705. J. Allen—Safety-valves.
706. J. H. Park—Water-closets, &c.
707. J. B. Massat—Manufacture of knives, &c.
708. B. Boyle—A centripetal flange.
709. H. Hughes and W. T. Denham—Improvements in organs, seraphines, &c.
710. W. M. Crosland—Blockmaking machinery.
711. A. F. J. Claudet—Stereoscopes.

*Dated 24th March.*

712. C. W. Siemens—Rotatory fluid-meters.
713. J. Beaumont—New manufacture of woven fabrics.
714. W. P. Sharp—Machinery for spinning and doubling cotton, &c.
715. R. Grundy and J. Jones—Machinery for preparing, spinning, and doubling cotton, &c.
716. C. V. F. de Roulet—Manufacture of piled fabrics, and warping machine, &c.
717. H. Webster—Gas stoves.
718. W. Keates—Manufacture of tubes and mandrils. (Partly a communication).
719. C. A. Holm—Propelling vessels.
720. G. J. and D. Jackson—Fasteners for buttons.
721. W. M'Naught—Steam-engines.
722. W. Edie—Manufacture of textile materials.
723. R. Walker—Working and increasing safety of railways.

*Dated 26th March.*

724. E. Symonds—Self-acting plug for boats, &c.
728. T. Smedley—Steam-boilers.
730. R. A. Brooman—Rag-tearing and separating machine. (A communication.)
731. G. Robb—Manufacture of sulphuric acid, &c.
732. J. Worrall, jun.—Preparing piled goods, and machinery for same.

*Dated 28th March.*

733. G. O. Ashbury—Manufacture of dowls in joinery.
734. J. G. T. Campbell - Ship's propeller.
735. D. S. Brown—Engines to be worked by steam or other elastic fluids, and for generating same.
736. A. C. Bernard and J. M. P. A. de St. Roman—Improved mode of giving publicity.
737. T. J. Perry—Improvements in printing.
738. J. Scott, jun., and G. W. Jaffrey—Steam-engines.
739. S. Fox—Umbrella and parasol frames.
741. G. E. Dering—Manufacture of certain salts and oxides of metals.

*Dated 29th March.*

742. S. Bayliss—Construction of ships.
743. S. Bayliss—Repeating fire-arms.
744. L. Smith—Machinery for weaving and printing.
745. T. Hill—Springs for railway and other carriages.
746. S. Newton—Self-acting friction-break for railway carriages.
748. R. Heath—Railway breaks and signals.
749. J. Rider—Cocks for drawing off liquids.
750. L. F. Keogh—Looms.
751. J. Gray—Application of heat for baking.
752. W. Henham—Plough.
755. J. Pym—Permanent way.
756. G. Shaw—Knives and forks.
757. J. Bernard—Boots, shoes, and clogs, and machinery for same.
758. J. Haddan—Railway carriages.

*Dated 30th March.*

759. M. Billing—Method of constructing walls of houses, &c.
760. W. Henham—Regulating draft of chimneys, &c.
762. J. Bowron—Manufacture of crown, sheet, plate, and bottle glass.
763. C. Nickels—Weaving narrow fabrics.
764. R. Dalgleish—Improvement in dyeing.
765. J. C. Ramsden—Looms.
766. J. X. Villiet, ainé—Production of ærated liquids.
767. J. Heuston—Weaving.
768. J. Worrall, jun.—Method of preparing, &c., cords, velveteens, &c.
769. L. Faulkner—Motive power.

*Dated 31st March.*

770. W. A. P. Aymard—Application of bituminous products of coal, &c., for lighting, and rectification of essences and other matters from coal.
772. R. M'Gavin—Construction of ships' masts, yards, booms, and spars.
774. J. Radcliffe—Looms.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 9th March*, 1853.

313. John Egan, of William-street, Limerick—Invention of a self-acting flax scutching and hackling machine with horizontal blades or hackles, an inclined plane on which flax-holders move, the application of the fan by a current of air, to press flax against scutching-blades or hackles, and spring-catch flax-holders.
344. Samuel Perkes, of 1, Walbrook, City—Improvements in certain apparatuses and machines for the production and treatment of mineral and other substances, and part of which are applicable for other useful purposes.

346. Samuel Perkes, of 1, Walbrook, City—Improvements in mines, buildings, and sewerage, for effecting sanitary purposes, and treating the produce therefrom.

397. Henry Moseley, of Wandsworth—Invention of a machine to be driven by the pressure of a fluid, or to displace a fluid, or to measure it.

406. Andrew Blair, of Mary-hill, Lanark—Improvements in printing or ornamenting fabrics.

431. Henry Hughes and George Firmin, of Plough-road, Rotherhithe—Improvements in the manufacture of lamp-black, and in recovering from such manufacture a substance suitable for fuel.

437. Arthur James, of Redditch—Improvements in needle-cases or wrappers.

477. Henry Charles Gover, of 9, Princes-street, Bedford-row—Improvements in the apparatus used in printing with colours.

499. James Brodie, of the Bow of Fife, Fifeshire—Improvements in the construction of sea-going vessels.

541. Thomas Wilks Lord, of Leeds—Improvements in safety and other lamps.

567. Richard Archibald Brooman, of 166, Fleet-street—Improvements in violins and other similar stringed musical instruments.

572. Henry Brinsmead, of St. Giles-in-the-Wood, Devonshire—Invention for shaking straw, to be attached to thrashing-machines.

626. Charles Phillips, of Bristol—Improvements in apparatus or machinery for reaping or cutting crops of corn, or other crops to the cutting of which reaping-machines are applicable.

640. Marc Klotz, of 77, Rue Rambuteau, Paris—Invention of an improved process and apparatus to be employed in ornamenting fabrics, leather, paper, and other surfaces.

876. Jean Hyppolite Silvanaine, of Paris—Improvements in the manufacture of paletots and other articles of dress, the said improvements being obtained by an improved process of felting and fulling.

910. Jules Barse and Paul Gage, of Paris, and 16, Castle-street, Holborn—Improvements in apparatus for manufacturing soda-water and other ærated liquids, and likewise in the preparation of the substances employed therein.

1030. Stephen Green, of Princes-street, Lambeth—Improvements in joining earthenware tubes and pipes.

1167. John Anderson, of Rugby—Invention for heating and ventilating apartments, and for remedying smoky chimneys, by a radiant ventilating grate.

27. Frederick Arnold, of Devonport—Improvements in heating the water in a bath or other vessels.

106. Hippolite Charles Vion, of Paris, and 16, Castle-street, Holborn—Improvements in apparatus for refrigerating.

162. Benjamin Quinton, of Birmingham—Invention of a new or improved fastening for brooches and other articles of jewellery and dress.

171. Henry Brinsmead, of St. Giles-in-the-Wood, Devonshire—Invention for reaping all kinds of corn.

179. John Henry Johnson, of 47, Lincoln's-inn Fields, and Glasgow—Improvements in aërial navigation, and in the machinery or apparatus connected therewith. (A communication.)

285. John Verinder Kiddle, of 4, Elder-street, Norton Folgate—Improvements in cocks or taps.

309. John Dudgeon, of St. Michael's-chambers, 42, Cornhill—Improvements in machinery used for raising propellers.

310. Jacob Vale Asbury, of Enfield—Improvements in railway carriages.

326. Alexander Parkes, of Burry Port, Carmarthen—Improvements in the separation of certain metals from their ores or other compounds.

346. John Seaward, of Canal Iron-works, Poplar—Improvements in marine engines.

401. Job Cutler, of Birmingham—Improvements in the manufacture of spoons and forks, and other similar articles for domestic use.

431. Frank Clarke Hills, of Deptford, and George Hills, of Lee, Kent—Improvements in refining sugar, and in preparing materials applicable to that purpose.

433. Charles Cowper, of 22, Southampton-buildings—Improvements in the manufacture of oxide of zinc or zinc white, and in apparatus for that purpose. (A communication.)

434. Charles Nightingale, of Wardour-street, Soho—Improvements in drying and heating certain substances or articles.

*Sealed 13th April.*

366. Joseph Nash, of 3, Thames-parade, Pimlico—Invention of the treatment and refining of sugar.

374. Christopher Hill, of Swindon—Improvements in the manufacture of lubricating matter.

375. Gerard Andrew Arney, of Mitcham—Improvements in coating or enamelling pictures, prints, paper, and other surfaces.

379. John Henry Lee, of 31, Northampton-square—Improvements in sawing.

396. James Lochhead, of Kennington, and Robert Passenger, of Union-street, Southwark—Improvements in the manufacture of glass and other vitrified substances, and in ornamenting and annealing the same.

417. Pierre Augustin Pius, of Paris, and 4, South street, Finsbury—Invention of an improved chain or cable, and an apparatus employed therewith, for certain applications.

424. John Henry Johnson, of 47, Lincoln's-inn Fields, and Glasgow—Improvements in drying, and in the machinery or apparatus to be used therein.

443. William Chisholm, of Holloway—Improvements in obtaining caustic, soda, and other substances, from the residues of articles used in the purification of gas.

484. George Ellins, of Droitwich—Invention of an improved method and apparatus for dressing and cleaning flax straw.

526. James Nasmyth, of Stafford-street, Bond-street—Invention of an improved mode of utilizing running waters.

527. Joseph Charles Frederick, Baron de Kleinsorgen, of New-street—Invention of an improved apparatus for indicating the variation of the magnetic needle.

537. William Robert Bertolacci, of 45, Rue d'Amsterdam, Paris—Invention of an improved pneumatic ink and pen-holder.

546. James Nasmyth, of Stafford-street, Bond-street—Improvements in the mode of obtaining and applying motive power.

634. Emily Petit, of 10, Brompton-terrace, Brompton—Invention of a musical instrument, which she calls an "Euphatine."

649. Andrew Lawson Knox, of Glasgow—Improvements in the manufacture or production of ornamental fabrics.

784. Robert Walker, of Glasgow—Improvements in the construction of portable houses and other erections.

936. John Norton, of Cork—Improvements in shot or projectiles.

1209. Thomas Benjamin Smith, of Bristol—Improvements in calcining certain ores, and in the construction of furnaces for that purpose, and for converting certain products arising in the process into an article of commerce not heretofore produced therefrom.

13. Lazare François Vaudelin, of Upper Charlotte-street, Fitzroy-square—Improvements in apparatus for retarding and stopping railway carriages.

102. Frederick Joseph Bramwell, of Millwall, and Isham Baggs, of Liverpool-street—Improvements in steam machinery used for driving piles, hammering, stamping, and crushing.

255. Edmund Leach, of Rochdale—Improvements in the mode or method of preparing and spinning cotton, wool, flax, and other fibrous substances, and in the machinery or apparatus employed therein.

324. John Campbell, of Bowfield, Renfrew—Improvements in the treatment or finishing of textile fabrics and materials.

327. Edward Palmer, of Woodford-green, Essex—Improvements in carriages used on railways.

348. Charles Iles, of Peel Works, Birmingham—Improvements in pointing wire.

349. John Webster, of Ipswich—Improvements in treating animal matters, and in manufacturing manure.

360. George Hutchinson, of Glasgow—Improvements in treating oils and other fatty matters.

365. Sir James Murray, of Dublin—Improvements in deodorising cod-liver oil, in rendering it more agreeable and easier to use either by itself or mixed, and so as to be capable of being administered in larger quantities and with greater success.

396. William Blissett Whitton and George Samuel Whitten, of 18, Princes-street, Lambeth—Improvements in the manufacture of sewer and other pipes.

403. George Gray Mackay, of Grangemouth, near Falkirk—Improvements in the construction of drain pipes.

407. John George Perry, of 12, Westbourne-street, Hyde-park gardens—Improvements in bookbinding, to facilitate the finding of places in books.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| April 7 | 3443 | Despatch-box or Writing-case | John Fryer | 63, Charing-cross. |
| ,, ,, | 3444 | Improved Collar for connecting Pipes | J. C. Gunn | 6, Picardy-place, Edinbu |
| ,, 13 | 3445 | Shirt-front | John Paterson | Wood-street, Cheapside. |

# SOCIETY OF ARTS.

## FRIDAY, APRIL 22nd, 1853.

## SEVENTEENTH ORDINARY MEETING,

*Wednesday, April 20th,* 1853.

The Seventeenth Ordinary Meeting of the Society was held on Wednesday, the 20th instant, John Scott Russell, Esq., Vice-President, in the chair.

The following were elected Members:

Bastow, Robert, The Mount, Wilmington, Kent.
Belshaw, J., Adelaide-place, London-bridge.
Blair, Harrison, Kearsley, near Bolton.
Chantrell, William, Wirksworth.
Child, William Dimsdale, Forty-hill, Enfield, Middlesex.
Donkin, Thomas, Hanover-park, Peckham.
Foster, John, 16, Wigmore-street.
Goolden, Charles, M.A., 7, South-square, Gray's-inn.
Kilburn, William Edward, 234, Regent-street.
Rideout, William, Farnworth, near Bolton.
Rushton, Thomas Lever, Bolton, Lancashire.
Young, George, Leeds.

and the name of one candidate for membership was read.

Several communications which have been received in competition for one of the Society's premiums: "83. For the invention of a good and cheap lock, combining strength and great security from fraudulent attempts; cheapness, freedom from disarrangement by dirt, and requiring only a small key," were read.

I. "On Mr. E. B. Denison's new lock," by Messrs. S. Mordan and Co.

Mr. E. B. Denison explained the construction of this lock, of which two specimens had been sent to the Society for exhibition by Messrs. S. Mordan and Co., the makers of them. One of these specimens was a large lock for iron safes, and the other a drawer lock of the usual size. The following is the description which had been sent in by Messrs. Mordan:

This lock is submitted to the Society as complying with the requisition in their premium list of this year. It will be evident from inspection that both the tumblers and the "stump" of the bolt have greater strength and means of resistance to force, than in other locks of the same size; while the key of this lock, which is suitable for safes of the largest size, and capable of shooting any number of bolts, only weighs one-third of an ounce.

This smallness of the key in proportion to the size of the lock is not obtained, as in some other safe-locks, by diminishing the size and strength of the tumblers, but by giving the key nothing to do except raising the tumblers without the resistance of any springs. The bolt is shot by the handle, and the lock is thereby also completely locked *without using the key at all*, and the key is only required to raise the tumblers again to such a position that the handle can open the lock. Whereas in the class of safe-locks above referred to, the ultimate security is only that due to the strength and security of a small lock which is locked into the main bolt by a key made after it is shot by the handle. This mode of locking a door without using a key may be a great convenience to those who are obliged to leave their places of business before the time of locking up, and who are unwilling to leave their keys with clerks whom they might readily trust to lock up the books, and other things, by merely turning a handle; it also removes all temptation to leave the key in the lock, which sometimes exposes it to the risk of being stolen, or having an impression taken. At the same time it is free from the objections which apply to spring or self-shutting locks, though it possesses all their advantages.

We believe that this lock is quite as secure from picking as the famous American lock, which is much more complicated and expensive, and requires a very large key. The mode of picking, which was described in the *Encyclopædia Britannica* some years ago, but has lately acquired more celebrity from the performances of Mr. Hobbs, is here prevented, by rendering it impossible to feel or produce any pressure of the bolt on the tumblers, so long as the key, or any other instrument is in the keyhole. For when the key is pushed into the lock against the curtain, which is held up by a spring behind it, a square plug at the back of the curtain descends into a notch in the bolt, and so prevents it from being moved at all; and it is so constructed that when the curtain-plug is in this notch the stump does not quite reach the ends of the tumblers, and therefore, although it is perfectly easy to raise the tumblers by any key or picker, their bearing against the stump cannot be felt; and, on the other hand, if the bolt be drawn back by the handle, so as to bring the stump against the tumblers, then the curtain-plug cannot be pushed into the notch in the bolt, and the keyhole remains closed against the introduction of any instrument.

It has been stated that most tumbler locks, with keyholes of the ordinary size, can also be opened, by observing and measuring through the keyhole the distance from the drill-pin, or centre of the keyhole, at which the key begins to leave a mark on the tumblers. This is prevented here by the smallness and depth of the keyhole, both of which render it impossible to get a sight of the tumblers at the point where the key first touches them. In this way, therefore, the smallness of the key adds to the security of the lock, besides the more obvious advantage of convenience of carrying in the pocket, without the temptation to leave it out on account of its bulk; and it also renders it impossible to introduce any instrument of sufficient strength to force open by sheer violence a lock of this strength and construction. By way of security against drilling a false keyhole into the lock, there may, of course, be a thick case-hardened or chilled cast-iron plate between the lock and the front of the door; and it will be observed that nothing would be gained by drilling into the curtain, as you would only in time come out through the square plug into the inside of the door, and not into the inside of the lock.

As a proof of the indifference of this lock to dirt, as well as its simplicity, we have left the work as rough as possible. The tumblers are merely short lengths of hoop iron, and both the tumblers, and the friction-plates between them, are left as they come from the roller. In fact, instead of friction being, as in other tumbler locks, a thing to be counteracted as far as possible, the friction in this lock is an advantage, as it helps to keep the tumblers steady, in whatever position they are required to assume, either by the key or the handle; and for this purpose one or more of the separating plates is also bent a little, so as to make them always act as friction-springs on the tumblers. In tumbler locks of the usual construction, if a drop of thick oil, or any other substance, gets between any tumbler and the adjacent tumbler, or plate, it may easily overcome the power of the spring to depress the tumblers, and the lock then comes to a "dead lock," as there are no means of introducing a substitute for the power of the spring, so as to bring down the sticking tumbler; or if a spring gets broken, which occasionally happens where they are allowed to get rusty, the same result takes place; whereas, in this lock, there are no tumbler springs, and there is always the power of the handle to bring down the tumblers. It may be observed, also, that the curtain having no opening at all in it, keeps the key-hole closed against dirt, and the corroding effects of a damp or smoky atmosphere.

We are prepared to make and sell locks of this kind, of the large size here exhibited, and with eight tumblers, for 42*s*., which is cheaper than detector locks of even less size and the same number of tumblers, without any special provisions to prevent the mode of picking now so well known, and a great deal cheaper than detector locks which profess to contain such provisions, whether effectual or not. Locks of smaller size will be in the same proportion as to price; the one we send we can sell for 9*s*.; and if they should be manufactured on a large scale, we should be able to reduce the price still more, as the lock contains nothing requiring peculiar skill in the workman. We send also a small drawer lock of the same construction, in order to show that the invention is equally applicable to cabinet locks as to safes, although the advantages of the strength of the lock and the smallness of the key are of course more striking in large locks.

Mr. Denison stated that the lock is not patented, as he agrees with the many eminent persons who consider patents an obstruction to science.

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## II. "Description of Mr. Andrews' Snail Wheel Lock," by Messrs. S. Mordan and Co.

THIS communication is also accompanied by a specimen which, it is considered, satisfies all the prescribed conditions, excepting as regards the smallness of the key, which is of the usual size. Although this last condition is not exactly complied with, the lock is so perfect in every other respect, that we think the Society of Arts may be disposed to waive this objection. We are of opinion that it is impracticable to make a very small key to a good and secure lock, unless a *double* action be introduced; for in all *single* action locks the key must be solid, and strong enough to raise the tumblers and shoot the bolt; on the other hand, a double action lock is incompatible with simplicity and cheapness.

The great recommendations of this lock are: its great security from picking; its simplicity and consequent cheapness; its great originality; its unusual strength and durability; its non-liability to get out of order, from dirt or any other cause; the impossibility of making observations or measurements through the key-hole, with a view to making a duplicate key; its easy adaptability to any purpose for which locks are required.

As regards its security, it will be observed that the tumblers are circular, revolving on a pivot, instead of being oblong, which is the usual form; consequently, it is impossible to feel the pressure of the bolt upon them, as in nearly all existing tumbler locks; the oblong tumblers can only have a limited action in a small segment of a circle, and are therefore susceptible of a comparatively small number of changes, whereas the changes produced by the revolutions of circular tumblers are almost innumerable. From the extremely novel construction and arrangement of this lock, it is self-evident that no sight of the tumblers can be obtained which would in any way assist an expert thief to make an instrument to open it. We believe this lock to be as secure as any existing lock (without excepting the very expensive American lock of Hobbs), although it is the most moderate in price. Its simplicity and consequent cheapness is obtained by the absence of all springs in connection with the tumblers; by the original form of the tumblers, which enables us to stamp them out at the press from thin sheet iron; by the simple and direct action of the tumblers on the bolt; and generally from its being quite unnecessary to highly finish any of the parts, and the great ease with which the whole is adjusted. These exclusive advantages render this lock the cheapest of all perfectly secure locks.

The strength and durability of this lock equal its great security and simplicity; for the same causes which produce the latter advantages are precisely those calculated to produce the former, viz., the shape of the tumblers, the direct action of the lock, the absence of springs, high finish, and all intermediate delicate mechanism, leaving only the solid and strong parts to bear the wear and tear of years. For the same reasons, we scarcely see the possibility of this lock getting out of order from dirt on any other cause. One great recommendation of this lock consists in the perfect capability with which it can be adapted to any purpose, from the largest iron door or strong room down to the most delicate cabinet work; it can be made to any size, pattern, or thickness, an advantage not possessed by many secure locks.

Another recommendation is, that if the key should be lost, the lock can be altered in a few minutes (at little or no expense), by simply changing the relative position of one or more of the circular tumblers.

We are prepared to make and sell locks of this kind, of the size here exhibited, and with eight tumblers, for 30*s*., which we believe is much cheaper than any lock in the market possessing anything like equal pretensions. Small cabinet locks will be in the same proportion.

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The CHAIRMAN referred to the discussion on locks which had arisen last year, and said that it was then generally acknowledged that there was greater complexity in their formation than was desirable. The American lock was undoubtedly good; but it was very expensive. It also depended on the exhaustion of chances for being picked; and might, by perseverance, be "tickled" and opened. So far as he could judge Mr. Denison's lock did possess, in a considerable degree, some of the qualifications that were deemed desirable. It appeared simple and cheap, and also difficult to pick; but whether it would prove absolutely unpickable remained to be seen. In fortifying cities, the misfortune was that, no sooner did some clever individual invent what appeared a perfect defence, than some other person, still cleverer, invented a means of attack which rendered the fortification quite pregnable. Mr. Denison's invention was for the purpose of fortifying what might be termed the fortresses of wealth. He hoped if there were any gentlemen present familiar with the mechanical details, they would explain where Mr. Denison's fortification might be attacked, and how they would carry on the siege.

Mr. **Hensman** asked if Mr. Denison's lock possessed any advantage over the ordinary spring locks, so far as the possibility of locking the door and leaving the key inside was concerned?

Mr. **Denison** said it was possible, if proper care were not taken, to leave the key behind. For instance a person might put the key in his coat pocket, and in changing his coat leave the key there, and lock the door by means of the handle.

Mr. **Hobbs** inquired what space was left between the ends of the tumblers and the stump; and whether the curtain could be pressed back so far as to allow of the tumblers being felt, without the stump passing into the jaws of the tumblers?

Mr. **Denison** replied, just sufficient to clear them; but it depended on the delicacy of the work. In the lock exhibited, it was one-twentieth of an inch.

Mr. **Hobbs** said he saw nothing in Mr. Denison's invention which was not common to many other locks. The plan of turning the lock by means of the handle was common. Small keys for strong locks were also common; and in the French Department of the Great Exhibition, there was a lock exhibited in which six large bolts were shot with a key no larger than a watch-key; but he thought the smaller the key the greater was the chance of imitating it. In regard to cheapness, he did not see anything in it to warrant its being made one penny cheaper than many similar locks; and in reference to durability, he might mention that the friction of a rough piece of metal against a smooth surface, would be very destructive. The Chairman had spoken of the cost of American locks; and as this had been frequently stated in the public prints, and seemed to be very generally believed, he would take this opportunity of stating that such belief or opinion was erroneous, as American locks could be made as cheap as any good tumbler lock made in England. They could make a secure lock with a solid key, as cheap as any one; but if a lock with changeable bits was required, the additional security which it afforded must be paid for. He referred to the mode pursued in England of manufacturing locks, and said, that by the old process a man could only make *six* dozen tumblers in a day; whereas with proper tools he ought to be able to make *sixty* dozen. The locksmiths of this country made bad locks at a high price. The large boss on the keyhole was a great objection if it were intended for an iron safe, as it would project beyond the face of the door, and so afford facility for the use of a plug of steel and a swedge, by which a force of four tons might be brought to bear upon the lock. The keyhole ought to be flush with the door. With a small key, the surface being less the bits could not be so numerous, or changed so frequently, and hence the number of locks of any specific size would be diminished. In regard to the second lock, it was the invention of an American, Mr. Andrews, who had patented it twelve years ago. A few had been made, but they were not found to work, and had not come into general use. Another objection to Mr. Denison's was, the two processes required to unlock it. He had always found that the public preferred something very easy and simple of manufacture, and every lock requiring more processes than common locks would be objectionable; although some bankers and amateurs did not object to one with two or three motions.

The **Chairman** remarked that he thought the two processes of Mr. Denison's lock simple enough, as in ordinary locks both the key and the handle had to be turned.

**Mr. Hobbs** said that if, after unlocking, the door was closed, it again required the two processes, instead of simply turning the handle as in ordinary cases.

**Mr. Denison** remarked, in reference to Mr. Hobbs's statement, that there were strong locks, with small keys, already in existence, that these locks either required great delicacy of finish, or they were merely small locks fastening into the bolts, which bolts were shot by the handle, and therefore the security they afforded was only that due to the small lock. As to cheapness, he himself could say nothing about it, except that Mr. Mordan had fixed the price, and he thought him a competent judge in that matter; he had stated it to be lower than that of ordinary tumbler locks of the same size. He had nothing to say against American locks, which were in many respects admirable and ingenious. He quite agreed with Mr. Hobbs in his remarks about the mode in which English locksmiths conducted their manufacture, and thought they were very far behind-hand, and would be superseded by their American brethren, unless they introduced the improved systems of manufacture adopted by them in this, as well as in several other branches of trade. The size of his key had been stated to be an objection, as it was supposed that there could not be so many changes made in the bits. The lightness of the key was not, however, produced by shortening the length of the bits, but by reducing their thickness. With regard to the objection which Mr. Hobbs had made to the projection of the boss, he would merely observe that that did not at all affect the principle of the lock, and that there would be no difficulty in obviating it in future.

Mr. **Mordan** said that as he did not consider Mr. Andrews's lock fairly before the meeting, as there were no models or diagrams to illustrate it, he should say nothing of it, except to ask Mr. Hobbs if it were not true that the United States Government had applied it to the mail-bags?

Mr. **Hobbs** stated that the first lock made by Mr. Andrews was a bank lock, and that that was picked. He then made some improvements in it, and this was also picked. He then made a mail lock, which was applied to the mail-bags; but two years since, on the renewal of the lock contract, it had been taken out of Mr. Andrews's hands, as a superior lock had been produced by other parties.

Mr. **Winkworth** referred to the principle of Patents, to which he entirely objected, but did not then feel at liberty to open up the question. He was glad to learn that Mr. Denison had not taken out a patent for his locks.

The **Chairman** said in regard to the Patent Laws, he must plead guilty to being the owner of two or three patents; but he fully agreed with Earl Granville, the Philosophical Jury of the Great Exhibition, Colonel Sir William Reid, Sir William Cubitt, Mr. Brunel, Mr. Winkworth, Mr. Denison, and other gentlemen who had been named, that it would be an advantage to the ingenuity of this and every country if all property in patents were annihilated; and he believed that such a consummation was rapidly approaching. The position of inventors at present compelled them to patent their plans, not so much to prevent others using them as to secure to themselves the right to do so; for if they neglected to take out a patent for an invention, perhaps the next day some one else would, and they might be prevented from using their own discovery. Patents were multiplying so rapidly that they would shortly be of no service. Their great number would prevent them being of any use as advertisements, and the same cause would destroy the prestige at present attaching to them. The time was coming when inventions must stand on their own merits; and those most suited to the wants of the public, and brought forward with the most wisdom, would carry the day. He concluded by moving a vote of thanks to Mr. Denison and Mr. Mordan for the papers which had been read.

It was announced that at the next meeting, on April 27th, a paper would be read by the Very Reverend the Dean of Hereford, "On some Proofs of a Self-supporting System of Education."

## EAST INDIAN EXHIBITION.

Our members will be glad to hear that Her Majesty the Queen has been graciously pleased to comply with the request of the Council, at the suggestion of the East Indian Committee, to permit a selection of valuable productions of Eastern origin to be exhibited in Dublin; and directions have been given for them to be forwarded immediately. We have also to announce, as the result of similar applications, that the East India Company and the Asiatic Society have placed at the disposal of the Committee a large selection of articles from their museums, which cannot fail to prove both attractive and instructive to artizans and manufacturers.

The result of other applications to public bodies and private individuals will be communicated as soon as known. In the meantime the Indian Committee have to acknowledge the receipt of large contributions of Eastern design and manufacture from Mr. J. Reeves, of Clapham; Mr. G. Bridge, of Shepherd's Bush; and other gentlemen. Messrs. Hewitt and Co., of Fenchurch-street, have already shipped for the Exhibition an extensive assortment of porcelain, cut ivory, cabinet-work, pictures, embroidery, &c.; the greater part of which has recently arrived from China, and are quite new to Europe.

In the JOURNAL of March 18th, we announced the successful result of the visit to the Hague of Mr. Winkworth, the Chairman of this Committee, and of Mr. Roney, the Secretary to the "Great Industrial Exhibition of 1853." The Dutch Government has since forwarded a catalogue to Dublin of the articles of Eastern interest therein referred to, and which are now on their way to Ireland. They are still more extensive in variety and importance than was originally contemplated.

The Committee have received great assistance from Mr. John Deane, the Assistant-Secretary to the Dublin Exhibition.

## ESSAYS ON PORTUGAL.

ABOUT the period of the termination of the Great Exhibition, a Premium of fifty guineas was offered by Mr. B. Oliveira, M.P., F.R.S., for the best Essay on Portugal, to embrace the following points:—The Capabilities of that Country for Consuming the Manufactures of Great Britain; the Effect of the High Duties on the Wines of Portugal Imported into Great Britain; the Advantages to be obtained by a Reciprocal Reduction of Import Duties; the Effect of Railroads as a Means of Developing the Resources of that Kingdom, &c.

The following gentlemen having consented to act as judges—John Peter Gassiot, Esq., F.R.S.; Col. W. H. Sykes, F.R.S., John M'Gregor, Esq., M.P., J. O. Halliwell, Esq., F.R.S., and Gordon W. Gyll, Esq.—recently met to come to a decision upon the merits of the four Essays which had been sent in in competition.

No. 1, by *Daniel da Silva Pereira e Cunha, of Fundáo, Portugal*, advocates the promotion of the British connection by every practicable means, consistent with the true interests of Portugal.

| | Dols. | Cents. |
|---|---|---|
| Imports from Great Britain in 1848 . | 6,425,516 | 714 |
| Exports to do do . | 4,891,773 | 532 |

He reprehends the use of so large a quantity of French productions, France taking in return so small a portion of those of Portugal.

| | Dols. | Cents. |
|---|---|---|
| Imports from France in 1848 . . . | 402,152 | 505 |
| Exports to do do . . . | 35,057 | 522 |

He recommends the reciprocal reduction on all imports by Great Britain and Portugal of their respective productions.

No. 2, by *William Bell, Phil. D., London*, alludes to the early English relation with Portugal; the Methuen Treaty, and Pombal's attempt to create manufactures in Portugal—the error of M'Gregor; it recommends the abolishing of saint-days, and the establishment of railroads; it explains that Portugal has only one port (Lisbon) fit to receive large vessels; it refers to the Portuguese articles at the Exhibition in London, and to the effect which would arise by a reduction in the wine duties, which ought not to exceed 1*s*. or 2*s*. per gallon; it points out the policy of the Government not interfering with the private traders, and that it is the interest of Portugal to attend to the cultivation of the soil in preference to manufactures. This treatise does not give any statistics as to the capabilities of Portugal. It argues generally on the advantages likely to arise from a reduction of duties in England for the encouragement of a consumption of wines, and alludes to the evidence before the Committee.

No. 3, by *Dr. Whitehead, London*. The author of this treatise considers that Portugal would prosper if her lands were let to tenants. English farmers pay, in rent and tithes, 40,000,000*l*. per annum, and yet the produce of their industry forms a large portion of the wealth of the country. He casually alludes to the resources of Portugal—agriculture; and says that free trade, understood as such, would not be of any benefit, but that facilities should be granted by removing those restrictions to trade with such nations who would reciprocate, by taking her productions of wine, corn, and oil.

No. 4, by *Joseph James Forrester, of Oporto and London*, is by far the most elaborate treatise, and is replete with statistical information, entering fully, under distinct heads or chapters, into most of the points asked for in Mr. Oliveira's suggestion. A considerable portion is devoted to the former reduction of the Wine Company, which would now require to be modified to meet the circumstances arising from the recent decree of the Portuguese Government.

The judges decided that the Premium should be awarded to the last-named gentleman; but as all the other treatises had considerable merit, they suggested that Mr. Oliveira should offer to each gentleman a medal in commemoration of his labour, and in testimony of their appreciation of the merits of their works. This suggestion Mr. Oliveira intends to act upon.

## COLONIAL POSTAGE.

### INTERVIEW WITH THE PRIME MINISTER.

On Saturday a very numerous and influential Deputation of members of the Colonial and International Postage Association, waited upon the Earl of Aberdeen, at his official residence, Downing-street.

The Deputation was composed of the following gentlemen:—

Thomson Hankey, Esq.

Council.

George Moffatt, Esq., M.P.
Sir John Burgoyne, G.C.B.
Elihu Burritt, Esq.
Rt.Hn.Milner Gibson, M.P.
Colonel Sykes, F.R.S.
Matthew Uzielli, Esq.

City Committee.

T. H. Brooking, Esq.
Andrew Caldecott, Esq.
R. W. Crawford, Esq.
John Dillon, Esq.
Sir James Duke, Bt., M.P.
Alexander Gillespie, Esq.
John Diston Powles, Esq.
T. A. Mitchell, Esq., M.P.
Thomas J. Hankey, Esq.
E. A. Moriarty, Esq.
Saml. Gregson, Esq., M.P.

Deputies from—

Blackburn Commercial Association.
Bradford Chamber of Commerce.
Bristol Society of Merchant Venturers.
Bristol Chamber of Commerce.
Edinburgh Chamber of Commerce.
Manchester Commercial Association.
Manchester Chamber of Commerce.
Newcastle Chamber of Commerce.
Newcastle Commercial Association.
Hull Chamber of Commerce.

Members of Parliament.

Sir James Anderson.
Viscount Barrington.
Joseph Brotherton, Esq.
Henry Austin Bruce, Esq.
William Brown, Esq.
John Cheetham, Esq.
S. Christey, Esq.
Wm. H. F. Cogan, Esq.
Charles Cowan, Esq.
Frank Crossley, Esq.
William Evans, Esq.
W. F. Fagan, Esq.
Charles Foster, Esq.
M. J. Feilden, Esq.
Sir George Goodman.
Hon F. Leveson Gower.
George Hadfield, Esq.
Charles Hindley, Esq.
Joseph Hume, Esq.
James Kershaw, Esq.
William Kirk, Esq.
W. H. G. Langton, Esq.
W. Laslett, Esq.
Hon. Cecil Lawless.
G. Cornewall Legh, Esq.
John Macgregor, Esq.
W. Marshall, Esq.
Dr. W. Michell.
Robert Milligan, Esq.
J. P. Murrough, Esq.
B. Oliveira, Esq.
Robert Palmer, Esq.
Francis Pigott, Esq.
James Pilkington, Esq.
Thomas Phinn, Esq.
Nicholas Power, Esq.
J. Lewis Ricardo, Esq.
Osman Ricardo, Esq.
Baron Lionel de Rothschild.
Captain Scobell.
Sir George Strickland.
Charles Turner, Esq.
Right Hon. Henry Tufnell.
H. W. Wickham, Esq.

There were also present the following Local Honorary Secretaries of the Association, and other gentlemen:

Mr. James Hassell, from Bristol.
Mr. James Bush, from Bristol.
Mr. James Rock, jun., from Hastings.
Mr. J. W. Newman, from Walsall.
Mr. Leoni Levi, for Hull Chamber of Commerce.
Mr. Christian Allhuson, from Newcastle.
Mr. F. Filliter, from Wareham.
Mr. Malcolm Ross, V.P. Manchester Commercial Association.
Henry Ashworth, Esq., from Manchester.
Mr. J. Plowman, from Oxford.
Mr. W. Jollie, from Edinburgh.
Mr. S. Lovejoy, from Reading.
Mr. W. Crosskill, from Beverley.

Mr. Charles Knight, Mr. Thomas Winkworth, and Dr. Booth, F.R S.

Mr. Thomson Hankey, late Governor of the Bank of England, said, he had been requested to introduce to his Lordship the object which the deputation had in waiting upon him. He begged leave, however, first to mention, that he held in his hand an apology which had just been received from the Lord Mayor, expressing his extreme regret that public business detained him in the City, and prevented him from forming part of a deputation whose object he had warmly at heart. Letters had also been received from Sir John S. Pakington, Bart., M.P., expressing his regret that his position as Chairman of the Rye Election Committee prevented his attendance; from Mr. Forbes Mackenzie, M.P.; Captain Gladstone, M.P.; and other gentlemen, to the like effect. Mr. Hankey then explained at some length the views of the Association. He wished to call his Lordship's attention to this very striking feature in the postal statistics of the Colonies and the mother country;—that at the present moment the whole of the letters sent from England to the Colonies did not amount to above one per cent. of the entire number which passed through the Post-office. If he were correctly informed, the total number of letters in the year was estimated at about four hundred millions; and of this number, only about four millions were, during the past year, sent to the Colonies. When his Lordship recollected the immense extent of the Colonial empire of this country, the great development of commercial intercourse which had recently been witnessed, and the fact that there was scarcely a parish in the United Kingdom some of whose inhabitants had not relatives or friends in one of the Colonies;—when his Lordship recollected all this, and connected with it the fact which he had just mentioned, he could hardly fail to be convinced that there must be some radical defect in the Colonial Postage system. The deputation were anxious to suggest to his Lordship, that as one penny was put down for the receipt and arrangement of letters here, and another penny for delivery in the Colony—to both of which he believed Lord Canning had assented—so another penny would give 300*l.* per ton for carrying letters to any part of the world. This was so large a payment to the Government for undertaking what was indeed of the utmost importance, that he hoped the boon would at once be conceded. He believed that if it were granted it would lead to an immense increase of colonial postal communication; he even thought it probable that the increase would be far larger in proportion than that which had taken place in this country. Considering the extension of emigration, and of our commercial relations with every part of the world; considering that the principles of free trade could not be fully carried out unless the utmost power was given of communicating knowledge, of sending samples, books, information of every kind, and on every subject, from one part of the British empire to another. The deputation felt that this was a serious matter for the deliberation of the Government, and they hoped that this view would be concurred in by his Lordship.

Mr. HUME, M.P., referred to the great success of cheap postage here and in the United States. He was confident that, when a uniform rate of postage was established between the mother country and the Colonies, other nations would adopt it; at present, when any demand was made for a reciprocity of cheap postage, the answer was, "Let England set the example with her own Colonies." The country had a great work to do in the diffusion of civilisation and commerce. He wished to see the Colonies placed on the same footing as the Channel Islands, and the sea postage of a penny, if adopted, would carry out the principle of a penny postage to their remotest possessions. He considered that the best and the cheapest means of promoting intercourse with other countries, and extending trade and civilisation. Unless the circulation was complete and perfect, the health of man was not in a satisfactory state; and it was so in the body politic, and they would never have the principle of free trade fully carried out until communication was as free and unfettered as possible. They were every year sending from their shores vast numbers of the population, and it was of the greatest importance that they should encourage communication and intercourse between them and those they had left behind. The difficulties and expense of correspondence were such, that, from the moment the emigrants left these shores, they were cut off from all intercourse. He knew of nothing that would estrange them from the mother country more than such a system—(hear, hear)—whereas if they had facilities of communication with their friends at home, it would maintain and retain their feelings of affection for the country they had left. Let postage be as free as possible, and he was satisfied that it would do more to retain the friendly feeling which should exist in the Colonies, than any other means that could be pointed out. On all these grounds—commercial, social, and political—he hoped the Government would give the question its favourable consideration.

Mr. J. MACGREGOR, M.P., as representing a large constituency, fully concurred in the views and suggestions that had been submitted to the noble lord. He ventured to observe that the United States, although under a different form of government, had the same commercial system, transacted its affairs in the same language, and was intimately connected with this country by association and emigration. He trusted, therefore, that whatever arrangements might be made with those Colonies, the United States would be placed upon exactly the same footing. The population of America had increased tenfold since her declaration of independence, and, as it was the country from which they obtained much of the raw produce of their manufactures, they were connected with it by the most intimate relations.

The Hon. CECIL LAWLESS, M.P., said the question was one which was anxiously looked to by the people of Ireland. He would impress upon the noble lord that the amount of intercourse between that country and the Colonies was very great, as there were very few emigrants who had not left some friends behind them with whom they were anxious to communicate.

Mr. MILNER GIBSON, M.P., wished to say one word with regard to those whose interests, both commercially and socially, he had the honour to represent. He thought it was most important, not only with reference to the Colonies, but to foreign countries, that the proposal of the deputation should be adopted, and he would more particularly instance the United States, with which he thought they might at once make arrangements for a uniform ocean postage. As regarded the question of revenue he did not offer any opinion—it was very probable that a large portion of the revenue would be replaced, and it was at least certain that the effect of the present rate of postage was not to give a corresponding increase to the revenue. The probability, on the contrary, was that it sent a great deal of the correspondence through other channels. (Hear.) It appeared to him that the giving increased facilities to correspondence and communication was one of those services which were indirectly beneficial to the nation, and ought not to be considered solely as a matter of revenue.

Mr. HADFIELD, M.P. for Sheffield, observed that the whole of his constituency were strongly in favour of a great reduction.

Mr. ROSS, of Manchester, said the success of the experiment with the penny postage at home should induce the Government to accede to the present demand without any hesitation. They might rest assured that the agitation would not cease until the boon had been fully conceded.

Colonel SYKES, referred to the case of India, and said, it had been found that as the postage was diminished, the correspondence had largely increased; in that country there were great difficulties in the way of conveying letters to the remote provinces, but as the roads and other means of communication gradually improved, at last such a state of things had been brought about, that it was hoped they would be able to create a large increase in the correspondence by still further diminishing the postage. Within the last three or four months, orders had been sent out to India to reduce the postage in the interior to a uniform rate of 1½*d.* from one extremity of the empire to the other. (Hear, hear.) To give a personal instance of the inconvenience of the present system, he had had forwarded to him by the last mail to Southampton an official book, the postage upon which was no less than 9*l.* 14*s.* (A laugh.) Of course he did not take it; he could not afford to release it. It was not rarely that books and other matters were sent to him by the mails which he was compelled to refuse. Then, with regard to books and papers, there was almost an interdict upon anything published in the English language. There were various important works of scientific associations, such as the Asiatic Society, which were printed there in English, but they could not be sent in consequence of the heavy tax with which they were burdened, independently of the postage. It was only by the kindness of friends that they were able to receive these works, which would otherwise come through the medium of the post.

Another gentleman was about to rise, but

The Earl of ABERDEEN rose at the same time and said—I am much obliged to the gentlemen present for their explanation of the reasons that have brought them to the conclusion at which they have arrived upon this subject. In many of these—indeed, in a great proportion of the reasons you have urged—I entirely agree. I admit all the importance which belongs to this question, as connected with the social advancement of the condition of the country; and I think you must admit that the importance of the question has been felt by the Government, when the proposal which has been made to you by the Postmaster-General is considered. I do not feel that I am in a condition to reverse the decision which the Postmaster-General has arrived at. I do not think that I should be acting consistently with my duty if I did so. It is not from any want of respect, I am sure, for the opinions urged by the various gentlemen who have addressed me to-day—far from it. I entertain the highest respect for the opinions they have expressed, but I do not feel that I could, consistently with my duty, reverse that proposal which has been made to you upon the subject. Gentlemen have said that they are ready to admit that a penny should be required for the domestic part, a penny for the colonial part of the expense, and complain of the enormous amount of the ocean part of the postage. Now, I am assured—and I dare say there are many gentlemen present connected with the shipping interest—I am assured that, if any one of them is disposed to undertake the charge of conveying letters, under the usual conditions, at that which they call an enormous amount, the Post-office will be very glad to accept his offer. I do not wish—and, indeed, I am not competent—to enter into the details of a question to which I have not devoted any minute attention; but, so far as I can understand the question as it has been represented to me by the office at the head of which Lord Canning is placed, I cannot say that I am prepared to reverse the opinion he has expressed on this subject.

The deputation then withdrew.

## HOME CORRESPONDENCE.

### DUTY ON PAPER AS AFFECTING PAPER-HANGINGS.

York.

SIR,—The influence of the paper duty upon the manufacture of paper-hangings must be viewed in special reference to the two branches of the manufacture into which I consider it to be divided, viz.:

1. The low-priced articles, the consumption of which is large and increasing, induced solely by the reduced price at which, by the aid of machinery, they are supplied, and which now find their way into the habitations of the working-classes, affording some degree of tasteful ornament to their abodes at a cost scarcely exceeding that of whitewash or colouring. By the middle classes they are extensively used for bedrooms and attics.

2. The articles whose value is contingent on the quality of the paper itself and the artistic merit exercised on the production of superior patterns, combined with the greater or less degree of expenditure made upon the ingredients used, such as colouring matter, and the number of colours necessary to produce a given pattern or design.

To show the effect of the duty upon the first class of paper-hangings, I will take a ream of paper weighing 300lbs., and being what is technically denominated a self ground, as gray, buff, pink, or blue, as the paper itself having been coloured in the pulp. Now the paper-stainer is paying for this paper *5l.* 15*s.* per ream (each ream producing 480 pieces of 12 yards each), or rather the nett cash price is *5l.* 12*s.*, 1*l.* 19*s.* 4*d.* of which is Excise Duty, or 55 per cent. on the raw material of the paper-stainer. The wholesale or manufacturers' price of this peculiar description of paper-hangings is 3½*d.* per piece, or 6*l.* 17*s.* 6*d.* per ream, and may be divided thus:

| | *d.* | |
|---|---|---|
| Cost per piece of paper, without duty . | 1¾ | the piece. |
| For duty . . . . . . . . . . . | 1 | ,, |
| For printing and profit . . . . . . | 0¾ | ,, |

So that the duty alone is 25 per cent. more than the printer realises for the cost of printing, colours, pattern designers, and the usual expenses attending all commercial operations, including travelling, clerks, &c. The first and most prominent feature of this statement is that as the payment of the Excise duties is made first by the paper-maker, and next repaid to him by the stainer at a very short date, and as the usual period of realising returns on paper-hangings is six, nine, and twelve months, the stainer is necessarily compelled to employ, solely for the benefit of the Government, a much larger amount of capital, with the attendant risk of bad debts upon that amount of capital; or what is frequently a more serious matter, the sacrifice upon patterns that may not be so saleable, and which are eventually sold at a sacrifice of profit and manufacturing charges, but on which the duty has notwithstanding been imperiously demanded. But it will be argued by the advocates of the Excise duty that no benefit can possibly accrue to the public by its repeal, for in the sale of paper-hangings in retail to the public, who buy by the single piece and at per yard, if the duty upon twelve yards is only 1*d.*, it will not be possible to make any tangible difference even in a single piece. Granted; but if the working mechanic is paying a tax directly and indirectly of 1⅓*d.* per piece, even though he buys but four pieces at a time, the Excise laws compel him to pay a tax of 30 per cent. upon the article which his limited means can only command; whereas the wealthy classes, who can afford to purchase the more costly papers, pay scarcely 10 per cent.; and assuming that he does not obtain a remission of 6*d.* upon his four or six pieces, yet by releasing the paper-stainer from the payment of the duty, and adding to the productive power of his capital some 40 per cent., you are, by the force of competition alone, supplying to the working classes very superior papers, thus tending to the cultivation of a taste for neatness and comfort in their homes, which essentially aids in the elevation of the social character of a class who will hereafter prove the surest bulwarks of our national defence and the preservatives of our national morality; and the indirect influence upon national industry by the impetus given to this manufacture in the increasing demand for paper, and the concomitants of that manufacture and the immense addition to the demand for labour already existing, can scarcely be estimated. The next gradation of paper used in the manufacture of paper-hangings is a quality averaging in weight 340 lbs. per ream, of very large consumption, and sold to the stainer at 7*l.* per ream, the duty on which will be 2*l.* 7*s.* 1*d.*, or 45 per cent. on the raw material of the paper-stainer. A much more costly article is produced, the surface of the paper being grounded with colour, and patterns varying from one to fourteen colours are imprinted by machinery on the continuous web. Although the remission of the duty would not be felt in a nominal reduction of price to the public, yet the demand for labour, directly and indirectly, would be materially affected by relieving the capital of the paper-stainer from the impost to which it is now subjected, thus affording immediate facilities for improving the character and style of his manufacture, and supplying to the public at the present or (as competition would induce) a lower price, a more valuable article. The duty may be considered as essentially imposing a severe restriction (scarcely equalled in any branch of manufacture) upon capital and industry.

The weight of the paper used in this branch of the manufacture may be estimated at an average of 450 lbs., costing 12*l.* per ream, the duty being therefore

34 per cent. on the intrinsic value of the paper. This class of papers comprises the most expensive, from 2*s.* per piece up to 7*s.*, or even more, the yard, the value being entirely contingent upon the degree of artistic skill, and the value of the ingredients expended upon the production; and consequently the Excise duty is especially a tax upon art and design, not to say of capital, as many manufacturers of this particular class of paper, doing only a moderate extent of business, pay from 1,000*l.* to 1,500*l.* Excise duty per year. It is in this class of papers that the French paper-stainers have maintained so pre-eminent a position for superiority of taste, design, and execution over the English, forming, as it does, one of the leading manufactures of Paris, as French papers are exported extensively to almost every market in the world; and although subject to a heavy import duty, obtain a large consumption, even in Great Britain. Place at the command of an industrious and scientific paper-stainer a sum of 1,500*l.* per year, to be expended upon design, and let premiums be awarded for the best designs, it will require but a very humble discernment on the part of the public mind to perceive the immense impetus this branch of our manufactures would receive from the remission of the Paper Duty. The French manufacturer being entirely exempt from this impost, is at present quite on the vantage ground in competing with the English. Justice demands that the competition should be conducted with common fairness, and the rivalry of the two nations would result in the general advantage of both.

I have not deemed it necessary to enlarge, in these remarks on the paper-staining business, upon the statistics of the manufacture, but it will be very readily perceived that no branch of the paper trade will receive a greater accession of demand from the repeal of the duty than the article used by paper-stainers.

Yours very truly,

J. G.

## BOAT PLUGS.

SIR,—As a supplement to the paper on Lowering Ships' Boats, which was read before the Society of Arts on the 2nd of March, allow me to make a few observations on a subject of almost equal importance, namely, boat-plugs. My object in bringing this subject before the Society is not so much to present anything new, as to direct attention to a simple, efficacious, and inexpensive remedy for an evil, by which, on so many recent occasions, human life has been endangered. The object of "a plug-hole" in a boat, is not, as has been inferred by a leading journal, "to keep, as it were, a standing leak in the bottom," but to afford at all times a ready egress to the rain, to the water which is purposely thrown into the boats to prevent their warping in hot weather, and also to afford a ready discharge for the water on the accidental shipping of a sea, and thus to prevent any accumulation of weight in the boats. That which is essential to the safety of the boat, when hanging at the davits, becomes, unless a plug is at hand to stop the hole, a source of danger when the boat is lowered into the water.

Many plans of "self acting plugs" have been devised, which would allow the water to escape from the inside, but (when lowered) would be closed by the pressure of the water underneath; in all these, however, there was danger of their being fouled by sand or dirt, and also from the warping of the materials of which they were constructed from variations of temperature, and consequently, that in the moment of emergency they might fail to act. The simplest method of stopping a hole is by means of a plug; and it only becomes necessary that a plug properly fitted should at all times be attached to the bottom of the boat, near to the plug-hole, by a lanyard, or a chain. With a remedy so simple, so efficacious, and always at hand on board of ship, it seems marvellous that in so many instances it should have been altogether neglected.

In the case of the *Orion*, John Kelly, seaman, stated, in his evidence, that "I got the boat lowered, and got into it; I could not find any plug in the boat, to fill the hole, which allows the water to run out. The water came in." Edward Hawes, R.N., stated, that "It is the practice in the navy to have the plugs attached by a lanyard to the boats;" but several other witnesses testified that they never saw the plugs fastened. In the case of the *Amazon*, John Lamont stated, "When they got into the boat, they found it was impossible to give any assistance to others, for they shipped two or three seas. The plug was out when she was launched. It was stopped imperfectly with waste, and they had only three oars."

In the case of the *Queen Victoria*, one of the survivors stated, that "On reaching the water, however, it was found the boat was leaking fast, and must have gone down in a short time, were it not for the coolness and presence of mind of a young lad, who having searched with his hand, found that the plug-hole was open, and thrust his fingers into it."

I send you herewith two common bottle-corks; the one prepared as a boat-plug by Mr. James Beeching, the inventor of the Duke of Northumberland's life boat; the other by myself. Bottle-corks are always to be had on board ship, and with a little twine or fine cord a plug may be easily attached to the bottom of the boat, so as to be always in readiness for use; and should the plug be lost, a fresh one can always be got ready with the greatest facility. I am, Sir, yours, &c.,

W. STIRLING LACON.

Union Club, 15th April, 1853.

## VENTILATION OF MINES.

SIR,—I beg to call your attention to one or two points on the subject of explosions in mines, not alluded to in the Lecture of last week, and but slightly mentioned in the discussion which followed.

We can only hope to reduce the number of fatal explosions, either by giving the persons subject to such accidents an opportunity of escape by using the best means of indicating the approaching danger, or by removing the cause of the occurrences. The first object has been attained to a great extent by the use of the Davy Lamp; and I should not refer to this part of the subject, but for the omission of any notice of the modification of that ingenious invention by Messrs. Upton and Roberts. This lamp was tested by Dr. Pereira, and found to possess advantages above the ordinary lamp, being unaffected in circumstances fatal to the Davy. Dr. Pereira said that "The lamp Messrs. Upton and Roberts have invented appears a much more perfect instrument than the Davy Lamp; for in all the experiments hitherto made with it, the flame has not passed through the wire gauze" Dr. Turner remarked of this lamp: "Upton and Roberts have constructed a lamp through which I have in vain tried to cause the communication of flame, and which appears to me perfectly secure." The Society of Arts awarded a premium to Mr. Roberts for his improvements.

To accomplish the removal of the carburetted hydrogen, and the ventilation of mines, various plans are in use. 1. The natural mode, now almost universally discountenanced. 2 Causing a draught through the mine, by heating the air in one shaft, or one division of a shaft. 3. The use of a fan, on Mr. Brunton's plan. 4. Mechanical pumping, or exhausting. Of one plan of this kind (Struve's), a diagram was suspended in the room, but not explained to the Meeting. 5. Jets of high-pressure steam.

The furnace seems the favourite mode of ventilation, doubtless from its general efficiency, and the facility of application, the fuel being on the spot. It appears, however, that increase in the firing does not, beyond a certain limit, give a corresponding increase of draught through the mine, and hence the advisableness of more powerful means. The plan suggested by Mr. G. Gurney possesses the advantage of unlimited application. In 1835 that gentleman stated, "A mine of ten miles might have the whole of the air contained in it, taking the galleries to be five feet square on an average, driven out and filled with fresh air *every fifteen minutes*, let the area of the shafts be the smallest now sunk,—such is the singular power of the steam draught." In the year 1849 some of the most eminent scientific men of the day gave evidence before a Parliamentary Committee, approving of the plan; and the opinion was corroborated by practical viewers, one of whom stated that, "He had previously two upcast shafts appropriated to ventilation; in consequence of the introduction of the steam-jet he had obtained 85,690 cubic feet per minute, and had quite sufficient ventilation with one shaft only." And another gave evidence to the effect, that the use of the steam-jet nearly doubled the strength of the current in the particular mine to which he alluded, the furnace giving 48,948 cubic feet per minute, the steam-jet 95,984 feet.

If there exists a lamp so safe as the one stated, and a plan of ventilation so simple and effective as Mr. Gurney's, a very blameable indifference to human life must prevail among colliery owners, to allow of so many accidents occurring annually. Surely they should be held responsible for the lives of those in their service, and their acquital should depend upon the proof that the best means of obviating accidents, and obtaining thorough ventilation adapted to the particular case, had been employed to the satisfaction of the Government Inspectors.

I confess I do not perceive any great advantage from Mr. Ikey's plan; he might remove the carburetted hydrogen, but at the same time he would form carbonic acid gas, equally fatal to the miner, and, being heavier than atmospheric air, all the more weighty to lift from the mine.

Yours, W. S.

## TREATMENT OF FLAX.

SIR,—Your Journal of the 8th inst. contains a digest of Professor Wilson's interesting Paper on "The Preparation and Treatment of Flax," lately read before the Society, and also refers to some remarks subsequently made by me in reference to it. My observations were necessarily hasty and imperfect, being unwilling longer to occupy the attention of the meeting towards the close of a somewhat lengthened sitting. Perhaps, therefore, you will allow me to explain a little more fully than I could do on that occasion, what appears to me to be the real position of what is now commonly designated "the Flax question."

Without referring to all the various methods of steeping or retting flax in the state of straw, which have been practised or propounded from time to time, I think I may fairly place them all in one category, as based on the same principle of treatment, and range them under the term "wet processes," (according to Professor Wilson), against one of essentially different principle, which has been styled the "dry process," and which consists merely in separating, by mechanical means, the fibrous from the ligneous portions of flax straw, taken as it is pulled from the ground, with the exception of its being dried. Now I entirely agree with Professor Wilson that yarns spun from flax or fibre in this state would not be suited for fine fabrics, and that goods manufactured from it would be liable to fermentation, and consequent decay. But he labours under a mistake, as I endeavoured to show him, if he imagines that flax fibre separated mechanically by this "dry process," is incapable of being subsequently treated chemically, or that it may not be rendered very superior both in colour and quality to flax prepared by any of the "wet processes" before referred to, not excepting that of Watts or Buchanan. I pointed out the badness of colour in the samples which he produced as the result of Watts's plan; and I ventured to express an opinion, founded on extensive observation and experience, that all flax steeped or steamed in a state of straw would prove defective in this respect, and consequently difficult and expensive to bleach.

What might be the cost of plant necessary for carrying into effect either Watts's or Buchanan's process on a large scale, Professor Wilson has not sufficiently informed us; but I have no hesitation in saying, that independent of this outlay (which must be considerable), the cost of steaming or soaking in hot water any considerable quantity of so bulky an article as flax-straw, would prove highly disadvantageous in comparison with the total expense of the "dry process," combined with suitable and proper after chemical treatment. But, in addition to the cost of plant, and the cost of steaming or soaking under these new "wet processes," must be reckoned the very heavy expense of transporting the flax-straw from the farms to the steaming-works; unless, indeed (which I can hardly think likely), the advocates of these systems expect that the farmers will themselves erect the necessary works, and steam their flax as they now steam their turnips. Even in that case they would still have to provide for the subsequent scutching of their flax, a very tedious and troublesome process.

As a grower of flax, and having had extensive opportunities of obtaining information among flax-growers in Ireland and in Belgium, as well as in this country, I am persuaded that what is chiefly wanted and desired by them is a cheap, light, and simple machine, by means of which they may reduce the bulk of their flax-straw; separate the fibre, so as to sell it, in a partially cleaned state, to some flax-factor or preparer; and be able to retain upon their farms, either as food for cattle or for purposes of manure, the boon, or shove, which forms about three-fourths of the weight of the flax-straw. My attention has for some time past been directed to the construction of such a machine, and to an entirely new method of treating flax after it has been thus operated upon mechanically. This new system of flax preparation I purpose designating the "fibre process." With what success I have prosecuted my object, I hope to make manifest so soon as I have completed the requirements for a patent, which are in course of fulfilment.

I am, Sir, yours respectfully,
EDWARD DAVY.

Flax Works, near Crediton,
April 20th, 1853.

## PROCEEDINGS OF INSTITUTIONS.

**Barnet.**—A second Concert of sacred music, in aid of the Building Fund of the Barnet Institute, was given at the Town-hall on Monday, the 18th inst; Mrs. J. Roe, Mrs. W. Dixon, and Messrs. J. and G. Brooks being the principal singers. The performance, which gave much satisfaction, was under the direction of Mr. T. Brooks, who presided at the organ with great ability. The hall was well filled.

**Basingstoke.**—On Thursday and Friday evenings, two Lectures were delivered in the Town-hall, by Mrs. Balfour, to the members of the Mechanics' Institute, "On Contrasts and Parallels in the Lives of Celebrated Women, at the Times of great Revolutions in England, America, and France," and "On Home Influence and Early Impressions." The characters especially noticed in the former lecture, in connection with the great revolution and the Restoration in England, were Mrs. Hutchinson, Lady Fanshawe, Lady Russell, and Mrs. Bunyan; with that in America, Mrs. Washington and Mrs. Baith; and with that in France, Madame Rolande, Charlotte Corday, and Madame de Staël. The attendance on both occasions was large, and the deepest interest and attention were paid to both discourses.

**Battle.**—On Monday evening, Mr. E. Rowse delivered a Lecture at the Mechanics' Institution, on the subject, "Where am I?" The lecture embraced a glance at the aspect of our times, the progress of the physical sciences, recent revelations in astronomy, physical geography, geology, and physiology; and concluded by pointing to the triumph of mind over matter. The lecture was listened to with much attention, and was illustrated by numerous drawings and a map of the world. A vote of thanks was moved at the conclusion by the Rev. E. Parry, and carried by acclamation.

**Bedford.**—On Wednesday evening, March 30th, W. Hughes, Esq., F.R.G.S, gave a Lecture to the members and friends of the Literary and Scientific Institution, "On Volcanos and Earthquakes." T. H. Barker, Esq., M.D., Vice-president, took the chair; and at the close presented the thanks of the audience, which was more numerous than usual, to Mr. Hughes for his excellent lecture. On the 12th and 13th inst., George Barker, Esq., gave two Musical Lectures at the Institution. Many of the illustrated songs were encored. It was Mr. Barker's third visit to the Institution.

**Dover.**—The seventeenth annual meeting of the Museum and Philosophical Institution was held on the evening of the 5th inst., at the Lecture-room of the Museum; the Rev. William Yate, of St. John's, Dover, one of the Vice-presidents, in the chair. The Honorary Secretaries, Messrs. Rees and Phillips, presented the Report of the last year, which congratulated the Society on its increasing prosperity, and its union with the Society of Arts, London, and from which they had already received twenty-two publications, &c., and several circulars, containing valuable suggestions. The union being an era in the Society, a brief retrospect of its rise and progress from 1836 was given. The lectures during the session had been well attended; and it was hoped next session that lecturers from the Society of Arts would be made available. There had been several valuable presentations to the Museum, during the last year, of insects, minerals, fossils, shells, the sword of Oliver Cromwell, &c. The library had received an addition of ninety-five volumes. The number of members was 180. The treasurer's account showed a balance of 7*l.* 15*s.* in favour of the Society. The committee deeply regretted the loss by death of their President, Dr. Soulby, M.D., who was elected in 1847, and had rendered essential services to the Institution; and they recommended the appointment of Dr. Astley, M.D., of Dover, as his successor, who was unanimously elected. The officers for the ensuing year were then appointed, and a ballot taken to fill up the vacancies of the six retiring members of the committee. A vote of thanks was then passed to Mr. Phillips for his services as honorary assistant secretary, and also one to the Chairman.

**Newbury.**—The tenth annual meeting of the Members of the Literary and Scientific Institution was held in the library on Tuesday evening, the 5th inst.: the chair was occupied by Mr. Joseph Bunny, M.D. The treasurer's account showed that there had been an excess of income over expenditure during the past year of 14*l.* 18*s.* 9*d.*; though 7*l.* 4*s.* had been expended for the museum, and 43*l.* 16*s.* 2*d.* in the purchase of 188 volumes of books. The total number of volumes now in the library is 2,096: the books taken out for perusal and returned to the library, during the year, were 4,545. The Report then refers to the Union of Institutions, and in speaking of the general interchange of privileges, says: "About 120 Institutions have agreed to this interchange; so that any gentleman in this room may feel that in his ticket of admission here, he may carry with him to 120 other places (stranger though he be) a letter of introduction to literary friends. Our Institution is thus become one of the links in a great chain of mutual courtesy and mutual improvement." A rule excluding all excepting the guinea subscribers from holding offices of control, or of voting for officers of the Institution, has been so far relaxed, that all members, irrespective of the amount of their subscriptions, have a vote for the election of officers. The Report of the Committee of the Reading-room stated that an expense of 39*l.* 0*s.* 10*d.* had been incurred for this object; the amount of subscriptions received being 37*l.* 6*s.* The largest number of subscribers amounted to ninety-five, of whom sixty were members of the Institution. The following gentlemen were chosen Directors for the ensuing year:—Messrs. Blacket, Canning, Hanson, A. Kimber, H. Mason, S. Palmer, H. Wiglesworth, Adnams, Hickman, Royston, Randall, and Vines. Mr. G. Barnes was re-elected Secretary; Mr. T. W. Fielder, Treasurer; Mr. W. J. Cowper, Librarian; and Mr. J. W. Roake was chosen Curator.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the Journal regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

"*A. C.*" should read Captain Huish's pamphlet, "On Railway Accidents."

"*J. S., Islington*," will find the list he requires in Dr. Hudson's "Treatise on Adult Education," published at Longmans.

## MISCELLANEA.

Mine Ventilation.—At the last monthly meeting of the North of England Institute of Mining Engineers, the subject of discussion was the relative merits of the Furnace and the Steam-jet in the ventilation of coal-mines. Mr. Nicholas Wood, the President, detailed the results of a series of experiments which he had made, with a view of ascertaining whether the steam-jet was useful as an auxiliary or not, because up to the point at which the furnace and the steam-jet acted together, or were of equal power, the furnace was unquestionably the most effective and economical of the two. The question was, whether after that the jet was an auxiliary to the furnace or not, and if so, to what extent it was useful or beneficial. He had ascertained, as might have been expected, that when the jet was applied to a current of air moving at a very great velocity, its application as a mechanical power became proportionably less; and when the velocity reached the extreme limit of the furnace, the steam-jet was scarcely able to follow the air: in fact, it rather opposed it, and the air had to drag the steam after it. There could be no doubt that an efficient auxiliary to the furnace was exceedingly desirable in a mining point of view in certain cases. With reference to that point, there was now erecting in South Wales, by Mr. Struvé, a very powerful machine, the piston of which was about twenty feet in diameter, and calculated to pump out about 10,000 cubic feet of air in each stroke. Both Mr. N. Wood and Mr. Stephenson agreed that steam employed in working such a machine was likely to be much more effective than when blown out of a jet. Mr. Stephenson thought the steam-jet a misapplication of force, which had arisen from a mistaken view of the cause of the efficiency of the steam-blast in locomotive engines. If the steam-jet were applied in a tall chimney, it would be of no use whatever; it would not then be in an energetic state, and all its force would be expended on the elasticity of the air in a very few feet.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 12th April.*

108. Superannuation Abatements, &c.—Return

*Delivered on 13th April.*

287. Pilotage (Cinque Ports)—Account.
294. Rochester Cathedral—Copy of Minutes.
308. Education—Minute of the Committee of Privy Council.
315. Crown Solicitors (Ireland)—Treasury Minute, &c.
320. Consolidated Fund and National Debt Redemption Acts—Resolutions and Orders of the House of Commons.
Pleuro-Pneumonia in Cattle—Papers.

*Delivered on 14th April.*

191. Local Acts—Reports of the Admiralty.
217(1). Blackburn Election—Index to Minutes of Evidence.
297. Spirits—Accounts.
314. Guano—Return.
316. National Debt—Account.
326. Bills—Aggravated Assaults (amended).
328. ,, —County Election Polls (Scotland)—amended.

*Delivered on 15th April.*

290. Maldon Election—Minutes of Evidence.
295. Lighthouses—Return.
299. Shipping—Returns.
300. Receipt-stamps—Return.
303. Diplomatic Service—Return.
317. Sir James Brook—Sir J. Pakington's Despatch.
318. Public Income and Expenditure, Imports, &c.—Accounts.
319. British Museum—Estimate, &c.
Turnpike Trusts—Reports of the Secretary of State.

*Delivered on 16th and 18th April.*

303. Diplomatic Service—Return (a corrected copy).
333. Lieutenant Engledue—Copies of Memorials.
334. Election Petitions—Alphabetical List.
335. Public Income and Expenditure (Balance-sheet)—Account.
191. Local Acts—Reports of the Admiralty.
292. Sale of Beer—Reprints of Reports from Select Committees.
323. Lunatics—Returns.
343. Dockyard Appointments—Copy of Letter, &c.
327. Bill—South Sea and other Annuities Commutation.
Revenue, Population, Commerce, &c.—Tables, Part 20.

*Delivered on 19th April.*

259. New South Wales, &c.—Return.
Ecclesiastical Commission (Brecon Collegiate Church)—Copies of Memorandum.

*Delivered on 20th April.*

288. Metropolitan Commission of Sewers—Account.
296. Duchy of Lancaster—Account.
324. Mercantile Marine Fund—Account.
325. Troops, &c., at Polling Places (Ireland)—Return.
359. Private Lighthouses—Return.
289. New Windsor Election—Minutes of Evidence.
362. Bills—London and Edinburgh Gazettes.
363. ,, —Oaths in Chancery, &c.—Lords' Amendment, &c.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette*, 15*th April*, 1853.

*Dated 26th March.*

726. R. Hazard—Apparatus for bath and lavatory purposes.

*Dated 31st March.*

771. J. Rylands—Yards and spars of ships.
773. G. Hanson and D. Chadwick—Measuring gas and water, applicable to obtaining motive power.

*Dated 1st April.*

775. G. F. Wilson—Night-lights and cases.
776. G. F. Wilson—Treating oily matters.
777. B. Brittain—Supporting bedsteads.
779. W. Crofts—Weaving.
780. J. Saunders—Railway tyres.
781. H. Spencer, H. Tattersall, and H. Simpson—Preparing and spinning cotton, &c.
782. R. E. Peterson—Improved piston. (A communication.)
783. G. F. Wilson—Manufacture of cloths, and preparation of wool.
784. G. F. Wilson—Treating greasy matters, and manufacture of candles.
785. G. F. Wilson—Night-lights, and apparatus for same.

*Dated 2nd April.*

787. G. Holcroft and W. Hoyle—Steam-engines.
788. G. Robb—Manufacture of sulphuric acid, &c.
789. N. F. Barthelemy—Sharpening razors.
790. A. R. Snelling—Emigrants' habitation cart.
791. C. G. Rosenkilde—Window-sash fastenings.
792. F. W. Mowbray—Doubling wool, &c.

*Dated 4th April.*

793. W. E. Newton—Engines by air or gases. (A communication.)
794. J. Findlow—Beds for the sick.
795. J. Palin—Evaporation and distillation.
796. W. E. Newton—Production of plates for embossing or printing, surfaces bearing devices, &c. (A communication.)
797. W. B. Johnson—Steam-engines.
798. R. W. Sievier and J. Crosby—Looms.
799. J. Ross and T. R. H. Ross—Machinery for combing wool, &c.
800. G. H. Brockbank—Horizontal pianofortes.
801. W. Walker—Drying malt.
802. M. Poole—Winding silk from cocoons. (A communication.)
803. F. Stiegewald—Manufacture of glass and porcelain.
804. C. May—Machinery for manufacturing and rolling iron.
805. F. Stiegewald—Heating furnaces.
806. A. Burq—Electro-galvanic apparatus for medical purposes.
807. J. Lawson—Suspension of ships' boats.
808. A. V. Newton—Self-inking stamping apparatus.

*Dated 5th April.*

810. W. Mavity—Manufacturing letters for type, and lettering for sign-boards, &c.
812. G. Purcell—New method of adjustment in printing, by means of certain combinations of different-sized spaces and quadrats.
814. J. Long—Setting up and adjusting ships' rigging.
816. J. Haley—Steam hammer.
818. W. Johnson—Weaving. (A communication.)
820. J. Thomas—Manufacture of gas and coke.

*Dated 6th April.*

822. E. Simons—Telegraphing.
824. J. J. Pratt—Improvements in stockings.
826. H. A. Jowett—Apparatus for heating generally.
828. W. Johnson—Ornamental surfaces in glass, &c. (A communication.)
830. S. Denison and H. D. Denison—Rating, breaking, &c., flax, &c.

*Dated 7th April.*

832. W. A. P. Aymard—Preparation and manufacture of candles, &c. (A communication.)
834. J. Grist—Machinery for manufacture of casks, &c.
836. W. H. Wells, E. Mann, and J. Harman—Grinding wheat and other grain.
838. C. Mather—Power looms.

840. F. Le Mesurier—Apparatus for measuring and indicating a given period of time.
842. C. Nickels—Machinery for masticating, kneading, &c., India-rubber and other matters.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed* 14*th April*, 1853.

405. Allan Edwin Hewson, of Birmingham—Invention of certain improved modes or processes for making buttons, beads, and other ornaments of dress.

*Sealed* 16*th April.*

421. Charles Reeves, jun., of Birmingham—Improvements in the manufacture of knives.
422. George Randsfield Tovell, of Mistley, and John Mann, jun., of Colchester—Improvements in the construction of ships and other vessels.
429. William Harcourt and Joseph Harcourt, of Birmingham—Improvements in the construction and manufacture of match-boxes.
436. Robert Mole and Robert Mole, jun., of Birmingham—Improvements in the manufacture of swords and hatchets.
444. Gabriel Benda, of Basinghall-street—Improvements in apparatus for obtaining fire for smokers.
454. Charles Clarke, of 43, Preston-street, Brighton, and John Gilbert, of 10, Hyde-place, Hoxton—Improvements in the supply and distribution of water and other fluids.
462. Jacob Tilton Slade, of Pall-mall—Invention of an improved hoisting apparatus.
470. William Lukyn, of Broad-street, Nottingham—Invention of a liquid draught detector, or self-measuring tube, with a union conveyance tap, and its stock and time-table.
473. Julian Bernard, of Guildford-street, Russell-square—Improvements in the production of ornamental surfaces upon leather.
486. Julien Boilesoe, of 4, North-terrace, Brompton—Invention of an improved mode of preserving vegetable substances and animal coatings.
495. David Crichton, of Manchester—Invention of arrangements and apparatus for producing continuous circular motion, giving a series of different velocities obtained from alternate motions, applicable to looms and other machines.
504. George Kennedy Geyelin, of Camden-town—Invention of an improved machine for grinding pigments or other vegetable or mineral substances.
547. James Henry Smith, of Connaught-terrace—Improvements in corsets.
302. William Brown, of Birmingham—Improvements in the construction of metallic bedsteads.
305. Philip Webley, of Birmingham—Improvements in repeating pistols and other fire-arms.
375. George Lee Lysuar, of 85, Park-street, Grosvenor-square—Improvements in swivel-hooks and such-like fasteners.
395. Alphonse Reue le Mire de Normandy, of Judd-street—Improvements in the manufacture of articles made of gutta percha. (Partly a communication.)
406. Edouard Sy, of 17, Clifford-street, Bond-street—Improvements in bookbinding.
422. Isaac Frost, of 49, Tavistock-terrace, Upper Holloway—Improvements in reaping or cutting crops.
428. Henry Noad, of 7, Langthorn-street, Stratford, Essex—Improvements in treating corn or grain, and obtaining products therefrom.
446. Benjamin Barton, of Old Kent-road—Invention of an improved bath, which can also be used as a life-boat.
448. John Davie Morries Stirling, of Larches, near Birmingham—Improvements in the manufacture of wire.
450. James Hudson, of Halifax, Yorkshire, and Thomas Bamford Hudson, of Malton, Yorkshire—Improvements in the manufacture of bricks, tiles, and drain-pipes or tubes.
404. William Spence, of 50, Chancery-lane—Improvements in machines for thrashing and winnowing corn and other agricultural produce. (A communication.)

*Sealed* 19*th April.*

439. John O'Leary, of Liverpool—Invention of certain improved apparatus for indicating the number of passengers entering in or upon omnibuses, and also their exit therefrom.
445. Thomas Bell, of Bristol, and Richard Chrimes, of Rotherham, Yorkshire—Improvements in valves, applicable to the receiving and discharging of water or other fluids.
449. William Wilkinson, of Nottingham—Improvements in the manufacture of ropes, bands, straps, and cords.

*Sealed* 20*th April.*

461. Thomas Henry Biddles, of Mansfield-road, Nottingham, and John William Duphrato, of Radford, Nottingham—Improvements in machinery for the manufacture of textile and looped fabrics.
535. James Coury, of Manchester—Improvements in umbrellas and parasols.
607. Francis Daniel, of Camborne, Cornwall—Improvements in stamp-heads.
631. Harrison Blair, of Colthurst, Mitten, Yorkshire—Improvements in apparatus for supplying steam-boilers with water.
728. George Stenson, of Northampton—Improvements in apparatus for separating gold from auriferous sand and earth.
730. George Philcox, of 3, Winchester-buildings—Improvements in marine chronometers and other timekeepers.
731. Edward Davy, of Crediton—Improvements in the preparation of flax and hemp.
743. Peter Forbes, of Shettleston, Lanark—Improvements in sowing or depositing seeds in the earth.
780. James Potter, of Manchester—Improvements in machinery for spinning cotton and other fibrous substances.
811. Benjamin Walker and William Bestwick, of Salford, Lancashire—Improvements in the manufacture of braid, and the machinery or apparatus employed therein.
949. John Bethell, of Parliament-street, Westminster—Improvements in machinery or apparatus for digging and cultivating land.
986. James Norton, of Ludgate-hill—Invention of an improved mode of transmitting motive powers.
1082. Archibald Slate, of Woodside Iron-works, near Dudley—Improvements in propulsion.
1083. Archibald Slate, of Woodside Iron-works, near Dudley—Improvements in the production of motive power from elastic fluids.
1084. Archibald Slate, of Woodside Iron-works, near Dudley—Improvements in propelling vessels.
1085. James Dunlop, of Haddington, N.B.—Improvements in saddles.
1090. Archibald Slate, of Woodside Iron-works, near Dudley—Improvements in the arrangements for working the slide-valve for the induction and eduction of fluids.
1091. Archibald Slate, of Woodside Iron-works, near Dudley—Improvements in steam-boilers.
1146. Nicolas Malinan, of Bordeaux, and 39, Rue de l'Echiquier, Paris—Improvements in stopping or covering bottles, decanters, pots, and other receptacles of glass, porcelain, and earthenware, and in the machinery connected therewith.
161. Louis Jules Joseph Malegue, of Paris—Invention of a certain colouring composition, for dyeing tissues or stuffs of silk or cotton.
243. David Stephens Brown, of 2, Alexandrian-lodge, Old Kent-road—Improvements in barometers, part of which invention is applicable to the registry of other fluctuations than those of barometers.
379. William Edward Newton, of 66, Chancery-lane—Improvements in apparatus to be employed for veneering surfaces. (A communication.)
415. Matthias Walker, of Horsham—Improvements in vessels or apparatus for containing and preserving ale, beer, and other liquors.
429. Nathan Dutton, of 31, Great George-street, Liverpool—Improvements in the manufacture and application of dowels, and machinery connected therewith, parts of which machinery are applicable to other purposes.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|---|
| April | 14 | 3446 | Buckle | Frederick John Jones | Addle-street, City. |
| ,, | 15 | 3447 | Writing-case and Taper-stand | John Simons | Birmingham. |
| ,, | ,, | 3448 | Apparatus for suspending or hanging Pictures | Simcox, Pemberton, and Sons | Birmingham. |
| ,, | ,, | 3449 | Stay-fastening | Joshua Harper | 9, St. Andrew's-street, Cambridge. |
| ,, | 16 | 3450 | Improved Crowbar | Joseph Lee and Co. | 94, Dale-end, Birmingham. |
| ,, | ,, | 3451 | Davies' Ladies Supporter | Wm. Griffith Davies | Hill-street, Bideford. |
| ,, | 19 | 3452 | The Emigrant's Companion | Thomas Youngs | 87, High-street, Poplar. |
| ,, | ,, | 3453 | Chimney Valve Seat | W. Pope and Son | 81, Edgeware-road. |

# SOCIETY OF ARTS.

**FRIDAY, APRIL 29th, 1853.**

## EIGHTEENTH ORDINARY MEETING,

*Wednesday, April 27th*, 1853.

THE Eighteenth Ordinary Meeting of the Society was held on Wednesday, the 27th instant, Sir John P. Boileau, Bart., Vice-President, in the chair.

A Paper was read by the Very Rev. the Dean of Hereford, entitled, "Remarks on the Importance of giving a Self-supporting Character, as far as possible, to Schools for the Labouring Classes; and the Means of doing so."

The Dean of Hereford commenced by stating that, in compliance with a request which has been made to me by the Council of this Society, I appear before you this evening for the purpose of addressing to you a few remarks on the subject of popular education. The results of my own experience and reflections on this subject have, of late, been so frequently submitted to the public, that I must begin by assuring those who are at all conversant with the progress and position of the question, that I have no new principles to advance; the substance, at all events, the drift of the remarks I shall make, will be found in what I have already published. I should therefore have insisted on its being more profitable for you to listen to some other experienced person in matters of education, had not the request been urged upon me in such a manner, that I could hardly consider myself at liberty to refuse.

I have no intention of taking any general or comprehensive view of the subject: on an occasion like the present, remarks of such a kind would be ill-timed, and to so practical an audience would appear unprofitable. I will strictly limit myself to those particular points which have been announced as the subject for the evening, and upon which I can bring my own experience to bear, and also that of other practical men engaged in the work of education, whose testimony in support of the principles I am advocating, is, I think, worthy of your attention.

I shall lay before you my own conclusions as to how far the principle of self-support is applicable to national education. I shall have to tell you in what sense I myself understand this principle,—how I conceive it may be brought to bear, what value I attach to it; in a word, what it is, and what it is good for.

I have been frequently quoted as having demonstrated the success of this principle. This, however, needs some explanation, as to what is meant by it.

The success of the schools established at King's Somborne, in Hampshire, demonstrated in the most satisfactory manner, the adequacy of the principle to effect the objects I myself had in view. But I do not consider that their success did prove the adequacy of the principle of self-support for certain other objects with which it was never connected in my own mind, and which must be provided (excepting in the most favoured localities) by other means.

In order to make this clear to you, it will be better at once to enter into particulars.

The expenses of a school are divisible into two distinctly marked parts. First, there are those expenses which are incurred antecedently to the schools being set to work: I mean the expenses incurred in purchasing the site, in building the school and teachers' houses, in providing suitable school-fittings and apparatus, and in educating and training the teachers. These expenses also are, to speak generally, incurred once for all.

The other kind of expenses are incurred annually: they are permanent expenses—they represent the cost of keeping the school at work, as the former represented the cost of starting it; they consist of the salaries of teachers, of the cost of books and other needful apparatus as the school progresses, of the outgoing for repairs, and a few other items of this kind.

Now it was to these latter permanent annual expenses (which I beg to observe have always been the most difficult to meet), that I endeavoured to apply the principle of self-support; and to this extent the King's Somborne schools, as you will see from the statistics I shall quote, have been, and continue to be, thoroughly successful.

In the case of Somborne, the first class of expenses to which I alluded were met by liberal assistance from the Committee of Council on Education, from the National Society, the Diocesan Board at Winchester, and by subscriptions from myself and others connected with the property of the parish.

From the first I determined to spare no expense in anything connected with the well-working of the schools, having an entire confidence in the principle, that this would, in the end, be the best economy. These views were justified by the result, and the success of the experiment; and although a considerable sum, as regards this first class of expenses, fell upon myself, this, thrown over a few years, made the school much less expensive to me, as clergyman of the parish, than the ordinary village school.

This class of expenses, however, ought not to be left or thrown upon private individuals; but every parish or school district ought to be enabled to charge themselves legally with it.

The property of the parish of King's Somborne was rated at about 6000*l*. per annum. Taking this first necessary outlay at 900*l*., and supposing there had been the power and disposition on the part of the ratepayers to charge themselves with it—throwing it over a period of thirty years, as is done in the case of building workhouses—how very light a burthen this would have been, considering the advantages resulting from it! And although I should at that time, even if there had been the power, have despaired of getting the ratepayers to agree to it, yet, with the light which has broken in upon them, through the school itself, during the last ten years, this question assumes a very different aspect.

You see, then, my object was a limited one; and in speaking of the King's Somborne school as a self-supporting one, the word "self-support" is intended to apply to the working of the school after it is once fairly established.

But my success in attaining it has been spoken of as if it had demonstrated the possibility of self-support in the widest sense, in which the word would be made to include all the preliminary expenses: and upon this has been founded an argument, that the aid of the State in educational matters was unnecessary, and, if unnecessary, of course mischievous. Now, as my schools did not prove this—and in fact, under the circumstances, could not be intended to do so—and as my opinions are strongly at variance with any conclusion which would reject the aid of the State, I thought it necessary to direct your attention as soon as possible to this distinction.

But as the whole value of my experiment depends upon the extent to which such schools can be raised up in other localities, I will now proceed to give you some account of it.

The parish contained, by the census of 1841, a population of 1,125, of whom about 800 lived in the village, and the rest were scattered over an area of about 8,000 acres. The farms were large, many of them having been formed of two, three, or four occupations, making the case proportionably less favourable to the success of the plan I had in view. The parish is a purely agricultural one, and in a purely agricultural district; and at that time, and for a long period of years, the Poor-rates had been extremely heavy, giving it a bad notoriety in that respect over the neighbouring parishes.

There was, therefore, nothing in the circumstances of the neighbourhood, or parish, nor in the history or character of the people, to predispose them towards making greater sacrifices for their children, for the purposes of securing some serviceable degree of education, or of enabling them to do it, than would be found elsewhere.

My aim from the first was to unite in the same school the children of the labouring classes and of their employers, being persuaded that the only means by which the children of the latter, in our rural districts, were likely to get an education equal to their wants, was by bringing it home to them at a cheap rate; and that if this were done, they would, in the end, gladly avail themselves of it, notwithstanding any prejudice against the mixture of classes, which I knew to prevail. This union of classes also was necessary to give the plan any chance of success, and the result has proved, in a most convincing manner, that where the instruction is good, and such as to meet the requirements of the parish and neighbourhood, that all difficulties may be overcome.

The schools were built on plans recommended by the Committee of Council on Education, and were opened in October, 1842. The rates of payment were, for the children of labourers, 2*d.* and 1*d.* per week; 6*s.* a quarter for the children of the employers of labour, and for those known to be able to pay it, living within the parish, and 10*s.* for a similar class living in other parishes.

The annual amount of school payments for the first eight years from its opening, are as follows:

| | Payments, including books, &c. | | | | Books. | | |
|---|---|---|---|---|---|---|---|
| 1st Year, from Mich., 1842, to | £ | *s.* | *d.* | | £ | *s.* | *d.* |
| Mich., 1843 ......... | 56 | 17 | 3 | Of this... | 7 | 6 | 5 |
| 2nd do., to Mich., 1844 ......... | 68 | 11 | 7 | ,, ... | 8 | 0 | 5 |
| 3rd do., ,, 1845 ......... | 84 | 6 | 1 | ,, ... | 11 | 5 | 3 |
| 4th do., ,, 1846 ......... | 93 | 5 | 5 | ,, ... | 15 | 8 | 0 |
| 5th do., ,, 1847 ......... | 145 | 6 | 6 | ,, ... | 24 | 8 | 1 |
| 6th do., ,, 1848 ......... | 146 | 3 | 7 | ,, ... | 30 | 2 | 1 |
| 7th do., ,, 1849 ......... | 164 | 16 | 7 | ,, ... | 39 | 2 | 7 |
| 8th do., ,, 1850 ......... | 174 | 4 | 9 | ,, ... | 41 | 1 | 8 |

These figures are a most satisfactory proof of the success of the schools, both as to numbers and the classes of life from which the children came. The greatest increase in any one year is 52*l.* 1*s.* 1*d.*, between Michaelmas, 1846, and Michaelmas, 1847, and this is owing to the improved process of teaching given to the school, by the introduction of pupil teachers, and other advantages arising from the Minutes of the Committee of Council on Education, issued in that year; and also to the impulse in favour of the schools both in the parish and district, arising from the practical conviction which had now been brought home to the parents, that their children were getting a really good and serviceable education. You will never prove this to them as a matter of theory; it can only be brought home to them by experiment.

The amount paid for books and other school necessaries, it will be observed, increased year by year, and at the end of the eighth year it is five times the amount paid in the first; in fact, so soon as the children became thoroughly interested in what they were learning, all difficulties were at an end, and the parents cheerfully and readily did all that could be expected of them.

It was the introduction of the reading books of the Irish Board of Education, at the cheap rate at which they are to be had, which led to the purchase of books to this large amount in these schools.

For the first two or three years the books purchased were almost entirely the ordinary reading books; this led to a taste for the introduction of others, and of cheap maps, both into the schools and into their homes, and for every 10*l.* spent in the purchase of cheap school-books, it has led at least to 20*l.* being spent on other books, thus opening out a market where none existed before; so that I very much doubt, whether even on trading principles, the London publishers are altogether right in the views they have taken up as regards the books published by the Irish Board.

The amount of payments in some measure denotes the numbers attending the schools, but it will not be uninteresting to add a few more particulars on this head.

The schools opened at first with 38 children, which, at the end of the year, increased to 106; and I perfectly recollect that, during this first year, more than 30 children were taken away or sent away by myself, because they would not conform to the rules; these, almost without exception, were glad to be allowed to return.

| | | | |
|---|---|---|---|
| At the end of the 2nd year ... | 110 | No great increase. |
| ,, ,, 3rd ,, ... | 144 | |
| ,, ,, 4th ,, ... | 158 | |

And at Midsummer, 1850, they had gradually increased to 219

Of these, 31 were paying 10*s.* per quarter, and came from other parishes—many from a considerable distance; and there were as many as 20 lodging in different respectable cottages in the village, some from Monday morning to Friday night, going home for Saturday and Sunday. There were 24 paying 6*s.* per quarter, sons of tradesmen and employers of labour in the village; and 164 paying 2*d.* and 1*d.* per week.

At Christmas, 1850, my connection with these schools terminated, and my successor in the living not entertaining the same views as myself, I was apprehensive they might suffer from this circumstance. He, however, agreed not to interfere with them, and the letter which I am about to read to you will show his change of opinion on becoming really acquainted with the education given, and the manner in which the schools were conducted.

Of the master and mistress I had the highest opinion, both as to their abilities as teachers, and on their zeal and industry; and in both my expectations have been fully realized. I visited the schools in March last, and was very much pleased with their general appearance. The amount of annual payments up to the present time shows, that the children, in numbers and position, are much what they were when I left the parish.

The master and mistress are both certificated teachers by the Committee of Council, and receive augmentation of salaries on that account. The letter from the Rev. Mr. Nicoll, is as follows:

King's Somborne, April 6, 1853.

MY DEAR SIR,—According to promise, I send you a statement of the present condition and prospects of the King's Somborne Schools, together with my impression, derived from the experience of upwards of two years, since I succeeded you in the parish, as to the practical working of the system of education which you had established, and for eight years so successfully carried out. You are aware that I came here with some slight degree of *prejudice* against that system, and of apprehension as to the principles on which it was founded; being not quite satisfied that I could conscientiously support it, though readily engaging not to interfere with it. You are also aware that a very short time convinced me of the needlessness of all doubt and hesitation, and happily and completely converted me to a sense of its excellence.

It has afforded me much pleasure to be assured by you, that, in the visit which you lately paid us, you found the schools in which you yet retain so warm an interest, in a satisfactory condition; and I have every reason to hope and believe that they will continue to maintain their high character and efficiency, and be a great means of extending the system adopted in them, and found to work with so much success, gradually and generally throughout the country. Indeed, in this latter respect, they have already exercised much influence, through the many pupils that have gone forth to other schools, especially during the last two or three years; and I am constantly receiving applications from various and distant parts of the country for a boy or girl of sufficient age and attainments to introduce the benefits of our system. This assistance has been always granted to the full extent of our means of supply, which, indeed, in one or two later cases, as you are aware, have not been adequate to the demand. Of those who have been sent out from the King's Somborne Schools, in whatever capacity, the accounts received have invariably been most favourable. Our numbers are still maintained, and we have, at present, some very promising children of both sexes, who will, I feel confident, do credit to themselves, and to the Institution in which they are receiving their education.

So much for the state and prospects of our schools. With regard to the general character of the system of instruction and management pursued therein, every year is testing its merits, and demonstrating its value; and I feel sure that the more extensively it is known, and the better it is understood, the more it will be appreciated. In reference to one peculiar feature in this system—its "self-paying" principle—that has been, I believe, for many years completely successful; at all events, I can state that, after paying every expense connected with the schools, a balance has remained in hand at the end of each year that I have been in the parish, and had the management of them. Before I came here, I had often heard of attempts having been made to establish schools on the self-supporting principle, and to introduce it into those already in existence; but almost invariably with the same unsatisfactory issue—partial success, if not total failure; though I believe, within the last year or two, some nearer approach to a successful result has been effected in a few instances. That the scheme is quite practicable, our own schools here, which owe their origin and their reputation to yourself, are a proof, where it is carried out to its fullest extent, and with the happiest effect. Other schools may, and no doubt in the course of time will, attain the same measure of success; but it must be by raising the present standard of education, by making the instruction offered of such a kind, so far in advance both in quality and practical usefulness of the usual routine which has so long prevailed in our national schools, as to induce parents not only of the lower, but of the middle classes—not alone the employed, but the employers—to avail themselves of its advantages for their children. That this would be the effect I have no hesitation in expressing my conviction, from my own experience, since I have been resident in this parish. I have found, also, that the rule by which the children are required to purchase every book, &c., which they use (a rule absolutely essential towards making a school self-supporting), is still working well, and appears to afford no ground of objection or complaint, nor to have acted as a means of *exclusion* in any instance that I have heard of: so far from it, I quite believe that the labouring poor generally, in the parish, justly and warmly appreciate the efforts which have been made in favour of education for their families; and that many parents, even of the poorest, do, and many more, if necessary, would readily and cheerfully consent to make some sacrifice of their already too scanty means, to secure for their children the benefits which our schools hold out to them.

I would add a remark upon one other point only in reference to our system, upon which I have reason to believe some misunderstanding exists amongst persons who have not had an opportunity of making themselves acquainted with its nature and character, either by personal observation or from the Reports of the Government Inspectors. I allude to the opinion prevailing in some quarters, that the course of instruction pursued in these schools does not include religious teaching; that it is restricted solely to subjects of "useful knowledge," to the acquisition of physical and general science—in a word, to what is commonly called a "secular education." Those who entertain this erroneous supposition have only to remember that Her Majesty's Inspectors require, at their annual visits, a sufficient degree of Scriptural information from the children generally; and that from the upper classes in all Church of England Schools some acquaintance with her doctrines and formularies is, in addition, expected; and, I believe, that on no occasion have they had reason to complain of any deficiency here in this respect. I have also continued to follow the excellent plan adopted by yourself, of receiving the senior children at my own house on the Sunday evenings; and I do not hesitate to say, that all who have visited our schools, and taken the trouble to ascertain for themselves, will testify that it is possible to combine a high degree of general useful knowledge with the principles of a sound religious education.

I am, my dear Sir,
Very sincerely yours,
CHARLES NICOLL.

The author then proceeded to describe some of the results already obtained in other schools where a more or less similar system had been adopted; the influence exerted by the Government Boards of Education; and lastly, the nature and effects of the numerous and large charitable institutions designed to advance education, but too frequently, from the manner in which they are managed, tending rather to retard than to promote it. In conclusion the Dean observed:

"I will now bring these remarks to a close. I have given you facts connected with my own experience, and also with that of other practical men. It is for you to judge what these facts are worth, and how far they can be a guide to others in attempting to establish schools in the districts in which they are interested; but you must always bear this in mind with respect to the agricultural districts, that, generally speaking, unless the children of employers and employed can be brought together in the same school, it will be impossible to support schools for the separate classes; and, whether the farmer and the great body of the employers of agricultural labour are to remain behind the rest of the community in the matter of education, mainly depends on our being able to establish such schools as I have been recommending.

"Since my undertaking to read a paper before your Society on this subject, I have been asked the question, 'What business has the Society of Arts with education?' This question may imply some degree of censure for your doing so, and I am not sure that it did not—I anticipate something of the kind may arise—but whether it does imply censure or not, I conceive it to be a matter of the greatest public importance that you have done so; and I also feel that you have, in a greater degree, perhaps, than any other existing body, the power of giving an impulse to that element in our popular instruction (I mean its having a practical and industrial character), the want of which has for many years made it so fruitless, and gained for it so little hold on public opinion.

"Certainly a much more sensible question to have asked would have been, 'In what way can the Society of Arts not promote the cause of education?' There are so many ways which must occur to yourselves in which you can do this, and in which you are better judges than myself, that I will not venture to suggest them.

"In the letter lately circulated by your Secretary, various and most important ways are suggested; the letter of Mr. Harry Chester some time ago gave me useful hints on this subject: but on these points, however tempting, I will not venture to enlarge. I will only express a hope, that in your efforts to promote the cause of education all over the country, you may not lose sight of those self-supporting principles, which appear to me so important in a social point of view, in raising the character of the people, and so necessary to the foundation of any system likely to be permanent, or in the management of which they will take an interest."

The EARL of HARROWBY, on rising to propose a vote of thanks to the Dean for his deeply interesting paper, remarked, that four or five years ago he, in common with many others, read with great interest the Dean's papers, describing the scheme he had carried out so well at King's Somborne. He was struck with the plan, as it seemed to meet two or three difficult questions in regard to education. The first was—how to get the funds; and the next was—how to educate the children of the middle classes, where they were thinly scattered over the surface of the land. The plan they had heard described seemed to meet these difficulties. By thus combining, in one plan, the education of the middle and poorer classes, the funds were raised from the former, who could pay liberally, to aid in providing a superior education for the latter. Another difficulty was—how to provide a good education for the middle classes. This was a question which every one must feel pressing with more urgency every day. Unlike the poor, who were generally willing to receive assistance, the middle classes were accustomed to pay for all they received, and anything which might appear eleemosynary in its character was highly repulsive to them. It was a difficulty which pressed in a variety of ways, and he, as a member of a Board of Guardians, as a magistrate, and as a landed proprietor, had often felt it. The middle classes were jealous as to what was done for the poor in the way of education. As regarded workhouse schools, Guardians were unwilling to do much, on the ground that the pauper children were being educated beyond those of the Guardians. Now, if they could get the farmers, and members of the middle classes to contribute to the support of these schools, and send their own children to them, they would feel an interest in them; their children would also get a better education at a less cost than elsewhere, and the difficulty would be removed of their unwillingness to aid in the education of the children of their workmen. It was not merely a question of jealousy: the children of small tradesmen and farmers were very often not intended to follow the trades of their parents, but for some other professions, and the children of the poor, in getting more educated, were supplanting them. In the present day, when a youth was wanted for any situation requiring good character, good handwriting, or responsibility, it was not to the middle classes, but to the sons of labouring men educated in one of the good schools of this kind, that application was made. Thus the question became to the middle classes a most important one. This was no reason, however, for not educating the poor, but only for endeavouring at the same time to preserve the position of the middle classes. Now, the Dean's plan just seemed to meet the case; by educating, in one school, the son of the farmer or tradesman and the son of the labourer, both would receive a good education, whilst the fact of the former being able to remain longer at school would give him the advantage which would preserve the relative social position of the two. There were, however, two or three practical difficulties. Where there was a population of 1,100, with a fair proportion of tradesmen and farmers, they had materials for a self-supporting school; but where, as in a large portion of country parishes, they had only from 100 to 500 persons, it was a much more difficult matter. Himself, and a few gentlemen in Staffordshire, had associated together for the purpose of trying the experiment. They established four schools, and got four good masters from the Battersea Training School. These, planted in four different places, were now doing good work, and were drawing farmers' sons into the schools. In one, there were twenty farmers' sons, and in the lowest, ten. He could not but feel that it was far from a selfish spirit which caused the local clergy occasionally to object to the sons of the farmers in their parish being educated in the diocesan schools of the neighbourhood; especially when it was considered that many of these clergymen were at great expense and trouble in promoting and improving their own parish schools. He fully agreed with the remarks of the Dean in regard to the evil influence of endowments; but in these cases they were obliged to assist by means of small endowments. They were not quite self-supporting, but were giving a better education than was formerly done at ten times the cost. In addition to the direct good of the education they were giving, they were exercising an influence in creating the expectation and demand for education; just as the establishment of improved lodging-houses had excited a general demand for an improved state of things in that respect. The question of payment by rates was considerable difficulty; he did not see how it could be done in one place and not in another. He fully concurred in the Dean's remarks as to the advantages of Inspectors; gentlemen who would not dictate, but by their advice and suggestions disseminate higher and nobler views of education than were common. Then they must not shut their eyes to the difficulty of convincing many farmers and others that anything beyond reading and writing were necessary to education. In a country parish, he had recently had to call the Duke of Sutherland to his aid in getting rid of an old blind pauper as a schoolmaster, the idea of the parish authorities being that a good teacher would teach the children of the poor more than their own children were learning. In one large London parish, a physician who sat at the Board of Guardians recently said, on a similar occasion, "What! will you teach these children Greek?" alluding to some extracts from Xenophon contained in the examination paper for a schoolmaster; and added, "Do your children learn French, German, mathematics, &c.!" By this means such an outcry was raised, and the current ran so strong, that they were obliged to abandon the idea of placing the school under the supervision of the Government Inspectors. He would now conclude by expressing his deep obligation to the Dean for the light he had thrown on a question which involved not simply the education of England, but through England, as a centre of influence, the future destinies, of the world.

**Henry Cole, Esq., C.B.**, rose to second the resolution. He also begged to move, that as the evening was far spent, and the subject was one of so much importance, that the discussion be adjourned until next meeting.

The **Rev. J. H. Hinton** seconded the resolution, which was carried unanimously.

The Dean of Hereford having consented to publish his paper in full at once, those members of the Society who were unable to attend the meeting last Wednesday will have an opportunity of reading it, before the next meeting, when the discussion of it will be resumed.

## CIRCULATION OF NEWSPAPERS IN THE UNITED KINGDOM.

In the communication which appeared in the Journal of the Society of Arts, on the 1st instant, page 217, it may be remembered it was stated that the increase in the number of penny stamps issued annually to newspapers in the United Kingdom, from 1837 to 1850, was 30,594,500. This increase was equivalent to 1·15 newspaper for each person in the United Kingdom; the proportion for Great Britain being 1·49 for each person, and for Ireland 36 for every 100 persons. The increase in the number of penny stamps issued to London newspapers was 20,035,455, of which the *Times* had 9,000,000, or nearly one half, being an increase of 9·03 papers for each person in the metropolis; in Manchester the increase was 964,762, or 3·05 for each person, of which increase the *Manchester Guardian* had 453,260; in Liverpool the increase was 789,785, or 2·1 for each person, of which increase the *Liverpool Mercury* had 267,750; in Leeds the increase was 191,000, or 1·11 for each person, of which increase the *Leeds Times* had 160,000; in York the increase was but 11,693, or 0·29 for each person, although the *Yorkshireman* increased 102,000; but this was absorbed by the decrease of other papers; in Birmingham the increase was 67,000, or 0·28 for each person, which was included in the increase of the *Birmingham Journal* of 259,000 stamps, the remainder being absorbed by the decrease in the circulation of other newspapers; in Bristol the increase was 157,750 penny stamps, or 1·14 for each person, of which increase the *Bristol Mercury* had 143,000, making the increase in the number of penny stamps for these places 22,217,445, and leaving 2,356,010 as the increase for the other places in England, containing a population of 13,488,390, being at the rate of 17 papers for every 100 persons. The increase in the number of penny stamps issued to papers in Edinburgh amounted to 1,413,922, or 8·8 papers for each person, of which the *North British Advertiser* had 282,300; the chief increase arose from the establishment of several new papers, and not from the increase of the circulation of the old papers; in Glasgow the increase was 1,372,675, or 4·2 for each person, of which the *Glasgow Herald* had 126,000; but the chief increase was from new papers, of which the *North British Mail* added 229,000; in Aberdeen the increase was 35,135, or 0·48 for each person, of which increase the *Aberdeen Journal* had 37,000; total, 2,821,732, leaving for the other places in Scotland but 207,498, or 9 papers for every 100 persons. The increase in the number of penny stamps issued to newspapers in Dublin during the above period was 1,828,850, or 7·8 papers for each person; of which increase *Saunders' News Letter* had 440,000, the *Freeman's Journal* 330,000, and the *Evening Mail* 45,000; the remainder was principally due to the establishment of new papers, of which the *General Advertiser* had 530,000, the *Nation* 108,500, and the *Tablet* 162,300; in Belfast the increase was 372,932, or 5·09 for each person; of which increase the *Northern Whig* had 227,500; in Cork the increase was 65,666, or 0·8 for each person; of which the *Cork Constitution* had 16,000, leaving only 225,192 as the increase for all the other places in Ireland, being at the rate of 35 papers for every 1,000 persons. This shows, that although the reduction in the Stamp Duty from 3½*d.* to 1*d.* had the effect of increasing the circulation of 5*d.* papers in the great towns and cities, yet they failed to do so in a corresponding degree in the country towns and districts,—showing that much cheaper papers are required for those districts, of an instructive and useful character, in the shape of news, and that it is probable that several millions of 1*d.* and 2*d.* newspapers would find a ready circulation where the 5*d.* papers never can reach. The foregoing shows the increase in the circulation of 5*d.* papers during a period of 13 years, in various places in the United Kingdom; but the following statement will show the proportionate circulation of the papers in the various places mentioned as they stood in 1850. The average circulation of newspapers bearing 1*d.* stamps in the United Kingdom was at the rate of 29 papers for every 10 persons, during the year 1850, or about 3 for each person. In England the average for each person was 4 papers; in Scotland, 2·2 for each person; and in Ireland, 0·9 for each person, or 9 papers for every 10 persons during the year. The average issue of newspapers bearing a penny stamp, in the year 1850, was—in London, 22·2 for each person; in York, 13·1 for each person; in Manchester, 6·5 for each person; in Leeds, 5·1 for each person; in Liverpool, 4·2 for each person; in Bristol, 3·8 for each person; and in Birmingham, 2·8 for each person; the aggregate population of these places being 3,432,931, and the number of penny stamps issued during the year 1850 was 54,289,272, or an average of 15·9 for each person. The aggregate population of the other places in England was 13,488,390, and the number of penny stamps issued to newspapers therein was 12,391,627, or 92 stamped papers for every 100 persons during the year. In Wales the average number was 63 stamped papers for every 100 persons, the population being 1,005,833. The number of penny stamps issued to newspapers in Edinburgh was at the rate of 17·2 for each person, the population being 160,302; the number of penny stamps issued to newspapers in Glasgow was at the rate of 7·1 for each person, the population being 329,097; and in Aberdeen the number of stamps was at the rate of 4 for each person, the population being 71,973, leaving the number of stamps issued to newspapers in the other places in Scotland at the rate of 51 stamped papers for every 100 persons, the population being 2,327,460.

The number of penny stamps issued to newspapers in Dublin, during the year 1850, was at the rate of 14·9 for each person; in Belfast at the rate of 8·7 for each person; and in Cork at the rate of 6·3 for each person, the aggregate population of these places being about 387,000, leaving the average for the other places in Ireland at the rate of one stamped paper for every five persons during the year, the population being about 6,300,000.

From the foregoing facts it must appear evident that the inhabitants of the metropolitan cities are very much better supplied with newspapers than the provincial towns or rural districts; and assuming that the metropolitan cities are sufficiently supplied with newspapers, which is very doubtful, it must be clear that the inhabitants of provincial towns and rural districts are very inadequately supplied with newspapers. Even supposing that one half of the newspapers published in London, Liverpool, Manchester, Birmingham Leeds, Bristol, and York, are distributed over the other places in England, after being read in the cities and towns mentioned, the average would only be increased from 92 papers for every 100 persons, to 293 papers for every 100 persons, which would give less than three papers for each person during the year. It is unnecessary to enter into the question as to the average number of persons who read each paper, although it is generally assumed that there are in London 10 readers to each newspaper; and supposing the same facilities exist in the provincial towns and districts for reading newspapers, it would then appear that each person in the metropolis had seven times the number of papers to read that each person among four-fifths of the population of England would have in the districts mentioned. It would follow, that if only two-sevenths of the 13,488,390 persons in England above referred to were only half as well supplied with 5*d.* papers as persons residing in London, the other five-sevenths, or 9,634,560 persons, must be wholly unprovided with newspapers, to say nothing of the large number of persons in Scotland and Ireland under similar circumstances, who are, no doubt, likewise deprived of news relating to passing events. Looking at the question in every point of view which the above statistics show, there can be no doubt that several millions of Her Majesty's subjects are left unprovided with news and useful information, which cheap periodicals could supply, if the restrictions with regard to newspapers and advertisements were removed.

It is probable that if the price of newspapers were raised to 1*s.* each, by putting on a 7*d.* or 8*d.* stamp instead of 1*d.* one, that a very large number would be purchased and read as at present by wealthy individuals, and persons engaged in trade; and that if the advertisement duty were raised to 5*s.* or 7*s.* 6*d.* each, it would not totally extinguish advertisements; but the effect would be to greatly reduce the number of papers and of advertisements. Under such a state of things, the great mass of the industrious classes would be deprived of news and other useful information; trade advertisements would disappear from the newspapers, and no doubt considerable dissatisfaction would be the result. The effects of a total repeal of the taxes on knowledge would be, to enable the wealthy and commercial classes to obtain their newspapers and literature at less cost, but to enable the industrious and working-classes to have cheap news, and increased facilities for advertisements which do not at present exist, and never can exist so long as any restriction remains. In order to show the probable deficiency of newspapers in various places in the United Kingdom, by presuming that the publication of twenty-two papers for each person in the metropolis is sufficient for the inhabitants of London, and, therefore, sufficient for every part of the kingdom; the result would be, taking twenty papers as the number for each person during the year, there would be a deficiency of newspapers in Liverpool, Manchester, Birmingham, Leeds, Bristol, and York, of 19,231,705, the present supply being 6,269,817; the deficiency in the other places in England would be 257,376,173. Assuming that only one-third of the number of newspapers published in London would be sufficient for the provincial towns and districts, or seven newspapers for each person during the year, the deficiency to be supplied by cheap newspapers in Liverpool, Manchester, Birmingham, Leeds, Bristol, and York, would be, independent of existing papers, 6,400,000, or rather more than 100 per cent. of the present supply; and for all the other provincial places in England the deficiency to be supplied by cheap newspapers would be 80,800,000, being 68,500,000 more than the present publication of 5*d*. papers in these districts.

Taking, on the same principle, one-third of the number of papers published in Edinburgh for each person as the average for the other places in Scotland, it would appear that there is not a deficiency in Glasgow; but in Aberdeen there would be a deficiency amounting to 560,000 papers, or double the circulation of stamped papers in 1850; and for the other places in Scotland, a deficiency of 12,000,000 of cheap newspapers, being more than ten times the number published in those places in 1850. Assuming one-third of the number of newspapers for each person in Dublin to be sufficient for the population in the other places in Ireland, there would appear to be no deficiency of newspapers in Cork and Belfast; but for the other places in Ireland there would be a deficiency of 30,000,000 of cheap newspapers, or twenty-five times the number of 4½*d*. and 5*d*. papers published in those places in 1850.

According to this estimate, it would appear that a deficiency of cheap newspapers exists in the United Kingdom of 129,200,000, being about 150 per cent. more than the number of penny stamped papers issued in the United Kingdom in 1850. There is one important consideration in this matter with regard to the circulation of newspapers, that in the places where they are freely circulated better order is maintained; and where the deficiency is most apparent, there disorder, outrage, ignorance, and lawless proceedings exist to a proportionate extent. In the country places in England, the deficiency, according to the above estimate, amounts to six and a half times the present supply; in the country places of Scotland, to ten times; and in the country places in Ireland, to twenty-five times the present supply. It is probable that the above estimate of the deficient supply of newspapers in the United Kingdom is considerably within the number required by the population.

One word with regard to the proposal of the Chancellor of the Exchequer to remove the stamp-duty from supplements to newspapers containing advertisements—a measure which has been designated by the *Daily News* as a "huge gift to the *Times*," and other papers, both in town and country, have repeated the assertion. A very little reflection on this subject will show that "the gift" to papers of smaller circulation than the *Times* is, in reality, much greater than to the *Times* in a commercial point of view, inasmuch as the smaller the circulation of a paper is, the greater will be the profit from advertisements inserted in supplements. For instance, a newspaper having a circulation of 4,000, will have to pay about 16*l*. for the paper of a large supplement, say 4*l*. for machining, 30*l*. for composition, and 25*l*. duty on, say, 1,000 advertisements at 6*d*. each, making together 75*l*. as the cost of the supplement; but a paper having a circulation of 40,000 would have to pay 160*l*. for paper, 20*l*. for machining, 30*l*. for composition, and 25*l*., as above, for duty on 1,000 advertisements, making together 235*l*. It is therefore evident that the paper of smaller circulation can take advertisements at a less price than the other. The paper with a circulation of 4,000 would make a profit of 25*l*. by charging, on the average, 2*s*. for each advertisement, while the paper of 40,000 circulation, at that price, would lose 135*l*. on each publication—it would therefore be compelled to charge a higher price, say 5*s*.; the produce would then amount to 250*l*., and leave a profit of but 15*l*. on ten times the circulation of the former paper. It would seem, that in common fairness the larger paper would be entitled to charge at least three times the price for advertisements that a paper would having but one-tenth of the circulation; and yet, with this increase in the charge, the profit would only amount to 65*l*.

This shows the immense field opened for cheap advertisements and large profits to papers of small circulation; and the folly of newspaper proprietors advocating the retention of even a 6*d*. advertisement duty, which must exclude many poor persons from advertising. There is a field open for the accommodation of 10,000,000 of advertisements in addition to those now inserted in taxed newspapers; but it cannot be occupied until every vestige of stamp-duty on advertisements and supplements is removed. It is therefore the duty of every newspaper to insist on the removal of the advertisement duty; or, in case of its being retained, to levy the same duty on every other mode of advertising.

## HOME CORRESPONDENCE.

### ON PATENT-RIGHT.

SIR,—The Society of Arts having been mainly instrumental in the investigation which resulted in an alteration of the Patent Laws, for the presumed benefit of Patentees, I have felt rather surprised at the indifference or approval with which opposite ideas were received at the meeting of April 22nd, on the discussion of Mr. Denison's lock.

"Mr. Denison stated that the lock is not patented, as he agrees with the many eminent persons who consider patents an obstruction to science."

It is quite clear that Mr. Denison, and the "eminent persons" he alludes to, have failed in mastering the first principles of patents, or they would not have imagined them an impediment to *science*. A patent is for an *art*, the artificial application of some natural principle—not for the *science* or knowledge on which the art may be based. Mr. Watt's patent for his practical improvements in steam-engines never prevented any one from studying the properties of steam..

The Chairman, Mr. John Scott Russell, in summing up, said: "In regard to the Patent Laws he must plead guilty to being the owner of two or three patents; but he fully agreed, that it would be an advantage to the ingenuity of this and every country, if all property in patents were annihilated; and he believed that such a consummation was rapidly approaching. The position of inventors at present compelled them to patent their plans, not so much to prevent others using them, as to secure to themselves the right to do so; for if they neglected to take out a patent for an invention perhaps the next day some one else would, and they might be prevented from using their own discovery. Patents were multiplying so rapidly, that they would shortly be of no service. Their great number would prevent them being of any use as advertisements, and the same cause would destroy the *prestige* at present attaching to them. The time was coming when inventions must stand on their own merits; and those most suited to the wants of the public, and brought forward with the most wisdom, would carry the day. He concluded by moving a vote of thanks to Mr. Denison and Mr. Mordan for the papers which had been read."

Giving full credit to all these gentlemen for disinterested views in the expression of their opinions, and altogether disagreeing with them, I purpose to set forth the other side of the question. There are two aspects from which to view it. One as the advocate of a race of men who have been large benefactors to society; the other as a dispassionate criticiser of the subject, to discover how, on the whole, the largest amount of good may be made to accrue to the greatest number. Society doubtless considers it a good thing to obtain all it wants as gratuitously as possible, and would be very apt to sacrifice the interests of a small class to attain its object; nor can the small class complain of this, for society has the right to determine whether it will issue premiums or not to quicken discovery; it is a question of bargain between society and a small class endowed with peculiar faculties, and if the small class be exorbitant, society may justly say, like the Yankee, "Upon the whole, I guess I'd rather not trade."

But when the "eminent men" alluded to by Mr. Denison, assume to be "society," the small inventive class stand forth and say, "By what right are these gentlemen set up as judges over us? What manner of men are they? Are they known for any great achievement in original art? Have they ever invented anything largely profitable as a manufacture, and given it gratuitously to the public? Have they written works, and presented the copyright to the community? If they be not of the practically inventive class, they are simply class legislators, willing to tax another class for their own and the public assumed benefit."

This and much more might they allege. They might say, "Mr. Watt was a scientific man, and patented the improved practical steam-engine. Sir David Brewster, after philosophically studying the laws of light, patented the kaleidoscope. Professor Liebig is said to be connected with valuable manure patents. The scientific inventor of gun-cotton also patented its use in the arts. Dalton patented nothing, and was almost starved. Numbers of men, of high reputation and success in material progress, have been patentees:—Arkwright, or those he represented; Heathcote, the elder Brunell, George and Robert Stephenson, and others; Penn, Maudslay, Donkin, and Muntz, of Birmingham; Mackintosh, Hancock, and others, are but representatives of many whose patented interests have best stimulated new manufactures."

Still further might the inventors go in their allegations. They might say, "Show us that these, our would-be judges, have no private or class interests to serve. They are 'eminent men,' land owners, pensioned professors, members of government, engineers; in short, persons holding power: and if there be amongst them lovers of power, covetous men, or ambitious men, it is their interest, according to their views, to keep us in the condition of hewers of wood and drawers of water, and makers of bricks without straw. We may work like the mulatto slave, George, described by Mrs. Stowe, and make inventions they may profit by, and reap the reward in cash and reputation."

But leaving the recrimination of the inventor, smarting under his real or fancied injuries, I proceed to take up the question on its own merits, beginning at the beginning.

In this England of ours, our great boast is our national and individual freedom, which gives to all equal scope, according to their natural talents and energy; so that the humblest individual *may* rise to be Lord Mayor, or Lord Chancellor, or anything under the Crown. We will not inquire whether incessant exercise of the Christian virtues is a needful ingredient in this progress, but certainly a faculty of acquiring money is; and whether position be attained by more or less of high qualities, it is an essential element in national progress that there should be a free circulation of all the members of society, that there should be an abundantly hopeful spirit, and that every one should have a fair chance of finding a position in which his or her natural aptitude may best fructify. Anything short of this is practical slavery. If children cannot get access to knowledge, they must be slaves; if grown people cannot develop their natural faculties, they must be slaves; and if the rules of society be such that capital only is power, and the means of acquiring capital be excluded from all but the actual possessors, we at once set up hereditary castes, and we shut out the hope of progress, and thus destroy our national energy.

The basis of all material progress is the earth—the great storehouse of the raw material of food and manufactures. If this be all in ignorant hands, there will be little else than wild game and wild men. A step higher, and we have herds of cattle tended by men of skill, who profit by the increase. Still farther on, corn-growers pay rents, wood grows scarce, and mines are opened; proprietors increase in number; mind grows, books are written and promulgated, and copyrights are agreed to—a novel species of property not belonging to the mere earth. But all hand-working mankind are drudges. Suddenly an inventor arises, captures the wind, and forces it to do man's drudgery. Another takes the moving waters; but these depend on locality, and the landowner claims his heavy fee: they are embargoed. Then comes steam, independent of locality; and the grateful world says, "Lo! this inventor has rescued us from drudgery and tyranny, and we will pay him tribute." Grumblers and rebels there were, who would gladly have profited by Mr. Watt's labours without paying him; but the common sense of the community recognized the justice and wisdom of maintaining his rights. From machine power grew up the use of machine tools, and then a host of new conveniences arose, almost without labour. "Men's clothes and food" became abundant; men and women increased; mills grew up, and supplies for the multitude gave more profit than supplies for the few. Patents multiplied, and manufacturers grew rich. People talked of cotton lords, and flax lords, as well as of lords of the soil. And by all this, the mass of the people benefited; for they were better fed, and clothed, and lodged. But their numbers increased; competition did its work, and lowered wages induced misery. Competition in the market induced newer improvements in machinery, and each new improvement became a property, in the form of a new patent. Capital accumulated, means of transit improved; but the mass of the working people could only remain workers, having no means of accumulating capital. The tendency of capital to accumulate in large masses constantly became greater, and every day the difficulty of rising in the world increased, and is increasing. With the accumulation of capital profits lessen, and the door is closer and closer barred to enterprise in existing operations.

With all this there is a tendency in capital to be conservative, to keep out competition. He who owns a cotton mill, with all existing improvements, regards with no favour the propounder of a new mill with still further improvements, who can work cheaper than himself. He dislikes patentees and improvers, and calls them "schemers," as a reproach. He does not want improvements; they only make him uneasy. A Manchester Yankee, who had risen to opulence by inventions, once said to the writer, "A scheme may be mechanically right, and commercially wrong; and, to say the truth, Sir, manufacturers never make improvements till profits get wiredrawn." There is no doubt that it is the interest of all capitalists who have invested their capital, whether in mills, or ships, or railways, to retard all such improvements as may deteriorate the value of their plant. They would remain stationary if they could, and suffer no one to intrude on their field of action. It has not been an uncommon thing for a mill-owner to buy up and quash a pretended improvement, likely to diminish the value of his own machinery. The mill-owner, with his vested interest in machinery, is not less a protectionist than the land-owner, with his vested interest in land, and to that extent he and the public at large are at issue. He is a capitalist and not an originator, and his cry is, "Great is Diana of the Ephesians." If he had his way, nothing new would be permitted. The possession of wealth would be confined to land-owners, mill-owners, railway-owners, and ship-owners, and their children's children in hereditary succession. We should become a nation of Chinese, and all originality would be at a discount. Or, if permitted, it would only be for the exclusive benefit of the possessors of power.

But, fortunately for the nation, the tendency of capital to increase constantly accumulates a large mass of *floating* capital seeking for employment, and bringing down the rates of profits by competition in existing things. This capital would, if it could, go into new things yielding larger profits. But new things require original minds, and they are not commonly co-existent with the possessor of capital. Moreover, new things require the outlay of capital in experiments. Men will not give their time and money to originate for the benefit of the public, unless they have some security that they shall reap what they have sown. There is but small satisfaction in perfecting an improvement under the consciousness that a hundred rivals are on the watch to secure the profit on its completion, without the smallest risk or outlay. It is the insufficient protection to patentees, and the mass of difficulties in which they may be overwhelmed by litigation, that deter capitalists from embarking in patented improvements. The expense of patents was long considered a hardship to poor men. The exertions of the Society of Arts lowered the price, but did not make sure the protection, or the adjudication between disputants, without heavy cost; and though patents have multiplied enormously for articles of small value, the more important inventions labour under the same difficulties as before.

The right application of the faculties of each individual in a nation, is the source of the highest prosperity. The application of one very common faculty—the business faculty, finds employment in many ways; but it must be busied more or less in the fabrication of matter for food, clothing, and other purposes. The nation that can produce the largest result, with the least amount of human drudgery, must be the most prosperous. For this purpose, it is essential that the originators be encouraged; if not, the nation will become stationary, or recede. Copyright in mind, in the form of printed books, has been granted by the legislature for three generations. The American legislature refused to acknowledge the copyright of foreign authors on their soil, and the result was, that native authors were neglected, because their booksellers could appropriate foreign labours gratuitously. Authors were consequently few. The American legislature recognizing the mischievous result, if not the injustice, have now given tardy redress, and obliged their booksellers to pay for organization; yet many books are the result of no higher character of mind than material inventions. Some material inventions require a higher character of mind than some books. Why should the book originator be more protected than the originator of material progress? If the patentee be not protected, the inventor will have no security, and will cease to invent.

There are several varieties of invention; some entirely personal, such as acting, printing, engraving, music, vocal and instrumental. For these, the owners do not need protection; they do not depend on any secondary application. Let them be born in what station they will, they rise to eminence, as corks float on water. All the world recognizes their merits. The writer of books, on the contrary, requires a medium—the bookseller and printer. His mental labour may be pirated, and the legislature interferes and gives protection to the writer, in consideration of the advantage of his labour to the public; and this for three generations: and usually a very small outlay is requisite for the author of the book to approach the public; and the successful author can become a capitalist. But the mechanical inventor has commonly a harder task, unless it be for some trifling article of ready sale; he has experiments to make in any case, and his term of protection is but fourteen years. But what if he be the inventor of an important improvement in ship-building? if he be not a protected patentee, what necessity has he for remuneration, supposing his invention to be recognized and adopted? Who will build a new ship on a new plan, and risk all the cost, if his neighbour builders may appropriate it without cost or risk? Or, if it be adopted, what is the likelihood of his being even recognized as the inventor? If he applies to a public company, they will recognize no right but patent right—if even this. What if it be an improvement in railways? will the inventor, if not a patentee, be duly introduced to the public as a national benefactor, and be paid in honour, or will the honour and profit be appropriated elsewhere? What if railway companies set their faces wholly against patentees, and refuse to use their inventions? It is in many cases their interest not to adopt or sanction any new improvements which may involve responsibility in the sacrifice of existing plant. What if the patentee applies to an ambitious man, jealous of all reputation but his own, or that of his class, will he not be contemptuously refused? And if the inventor be not a patentee, will not his plans be unscrupulously appropriated when no register secures them? Will not an unscrupulous person in power shut the door against all intruders? Is Mr. Pecksniff's printed market architecture an uncommon case? And can the public, in the long run, really benefit by this confiscation of the inventor's mind? for that, after all, is the question on which the opponents of patents rest the merits of their case.

But it may be alleged, that granting a patent to one individual to-day is an injustice to the individual who may hit on the same invention to-morrow. In answer to this, we shall find that valuable improvements are the results of individual efforts, long and steadily pursued—just as Acts of Parliament are the children, and bear the names of individuals. The invention is not all—there is the working out to follow. Inventions are of two kinds: those resulting from original perceptions of new principles, and the mere contrivances suggested to remedy proven defects in existing things; though many, even of these latter, are important. If, for example, the nation were spending a large annual sum to attain a certain speed in sea-transit by steam, the inventor who might show a method of saving a million per annum in coal, with increased speed, would surely be entitled to a handsome share in the gain; but if, after attaining success at the expense of many thousand pounds, and unceasing experiments, his neighbours were to come in and throw his whole gain into common stock, it would surely be a great injustice. Even in apparently small things, the man whose chemical skill, and knowledge, and persevering energy, could diminish the cost of food, spread over a whole nation, would be a national benefactor, and would not be overpaid by a large share of the profits. It is certain that people do go on and on in beaten tracks, wasting labour and materials; and it is not till an individual with perceptive faculties points out the evil, and prepares the remedy and energetically enforces attention to it, that improvement takes place,—and this after being denounced as a schemer at the outset. The first lighter of towns by gas died in poverty, but he hastened its application materially.

There is a notion prevalent that patentees are a class of persons who merely catch a floating idea, and embargo it without any service to society, and merely stand in the way of others who are serious workers. This also may be true, but it is not unmixed evil. They have pointed out a useful object to public view; and if their terms be too high for others to work with them, after the lapse of fourteen years it becomes public property.

It may be alleged, that a vast proportion of patents are frivolous. Doubtless, it is so; but the fact that unwise people waste their money has nothing to do with the question, if the small number of earnest producers of valuable inventions, who are benefactors to the community, cannot otherwise be secured against the cupidity of the unscrupulous, whose power or wealth may enable them to grasp the prize, and set the inventor at defiance.

It is notorious that the large capitalist everywhere drives the small one out of the market in all business not requiring peculiar personal skill; and it is only by new and improved processes that the poor and skilful man can extricate himself from his clogs, and rise. Even yet, the patent laws are not perfect. The cheap and rapid adjudication of disputes is needed, and also such an alteration of the law of partnership as will enable the capitalist, large or small, to join himself safely to the inventor to work out newer processes. When this is done, complaints will cease against the grasping tendencies of capitalists, and a new sphere of action will give a fresh development to the national energy, while the circulation of society from the lower to the higher, prevents the existence of that choice species of stagnation of which agricultural labourers have been an unfortunate type.

The evil of patents as regards the public has been the mode of recompensing the inventor with a monopoly. If, when his invention were perfected, the whole community were free to use it at a legal per centage, according to its class, the monopoly would cease; and a given portion of this per centage ought to accrue to the state, to be applied to the purposes of education. A tax collected from new and profitable inventions would be the least objectionable of all taxes, and the most easily collected. It would be an income tax, not from a poor and overburdened business, but from thriving prosperity, and applied to extinguish the sources of poverty. Many there are who will disagree with these views, and many, I trust, who will agree with them. The inventor who beheld his hope of rising in the world cut away from him, by his faculties being given to the many, might call it a species of one-sided socialism, and claim, that in return, he should be provided with his fair share of the raw materials and other capital of the community as a compensation.

I shall be happy further to discuss this matter in your pages with any opponent, with a view to get at the truth.

I am, Sir, yours,

Cosmos.

## PROCEEDINGS OF INSTITUTIONS.

**Bicester.**—On Saturday evening, the 16th inst., a lecture was delivered to the members and friends of the Literary Institution, on "El Dorado," by E. Watkin, Esq., of London. In the absence of the President and Vice-president, Mr. Johnson, F.R.A.S., one of the secretaries, was called to the chair. The lecturer was listened to with deep attention by a large audience; and at the close, a vote of thanks was unanimously carried for Mr. Watkin's gratuitous services. The Chairman, in acknowledging a vote of thanks, stated, that he was happy to inform the members present, that the Institution had recently been taken into union with the Society of Arts; and, after enumerating the benefits which might be expected to flow from such connection, said he trusted they could now look forward to a long career of prosperity and usefulness.

**Dunmow.**—On Tuesday evening last, a lecture was delivered at the Town-hall to the members and friends of the Literary and Scientific Institution, by the Rev. J. C. Rook, of Thaxted, "On Nineveh." The subject was illustrated by a large collection of diagrams, and the lecture gave great satisfaction to the audience. A vote of thanks was unanimously accorded to the Rev. J. C. Rook.

**Radcliffe Bridge.**—A free lecture to the members of the Radcliffe Bridge and Pilkington Lyceum and Mutual Improvement Society, and the public generally, was delivered on Thursday evening, April 21st, by Dr. W. Hudson, from the Athenæum, Manchester, "On education in Science, showing the facilities which every working-man has of learning Science," with chemical illustrations. The attendance was numerous, and the lecture was listened to with much attention, so that it is hoped that the advice given by Dr. Hudson will be followed, more particularly under the auspices of institutions like this. A vote of thanks was unanimously accorded to Dr. Hudson.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the Journal regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

## MISCELLANEA.

PUBLIC LIBRARIES.—Munich has seventeen public libraries, into every one of which strangers unquestioned may enter, peruse, and depart in peace. Of these institutions the most celebrated are lending libraries. Statistics preach where sermon does not lift its voice. Here are its words. In London, there are, in round numbers, 500,000 volumes accessible to the public, or about an average of 22 volumes to every 100 inhabitants. Dublin, with all its deficiencies, has 59. In Paris, the proportion is 160 volumes to every 100 inhabitants; in Berlin, 182; in Florence, 317; in Copenhagen, 467; in Dresden, 490; in Munich, 780. So that Paris is six times better provided than London; Berlin, seven times; Florence, thirteen times; Copenhagen, nineteen times; Dresden, twenty times; and Munich, thirty-one times.—*Correspondent of the Builder.*

BOOMERANG PROPELLER.—On a second trial of the Boomerang propeller, in the steam-ship *Genova*, the speed obtained was 10¾ knots by the log, the revolutions of the engines being from 56 to 58, a gain of more than one knot per hour on the speed by the common screw.—*Mining Journal.*

NEW YORK EXHIBITION.—A Commission has just been appointed by Government to visit New York, and report upon the Industrial Exhibition shortly to be opened there. The Commissioners named are, the Earl of Ellesmere; Sir Charles Lyell; Charles Wentworth Dilke, Esq.; Joseph Whitworth, Esq.; Professor Wilson; and George Wallis, Esq.

QUEBEC EXHIBITION.—An Industrial Exhibition is intended to be held at Quebec, to be opened on the 17th of May; and selections of the natural productions, and agricultural products and implements, will then be made, and forwarded to New York, to form part of the larger International Exhibition.

EXHIBITION OF PHOTOGRAPHIC PICTURES.—A collection of pictures produced by this art was opened at the Photographic Institution on Wednesday last. Some marked improvements are noticeable in the present exhibition; and many of those points which were thought to be incompatible with the art, are now being arrived at even in this country. M. Martens has some foreign scenes; M. Bresolin, a few fine Venetian views and Italian buildings; M. Flecheron, some Roman views: M. Perrier is also a contributor: and among English photographers may be named Messrs. Bingham and P. De la Motte.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 21st April.*
258. Troops, &c. (South Africa)—Returns.
332. Writs of Certiorari—Return.
317. Ramsgate Harbour—Sir John Rennie's Report.
338. Committals, &c. (Ireland)—Tabular Returns.
Queen's College, Galway—Report of the President.
Queen's College, Belfast—Ditto.

*Delivered on 22nd April.*
302. Lighthouse (Guernsey)—Estimate.
339. Kilmainham Hospital—Copies of Charter, &c.
360. Arterial Drainage (Ireland)—Copy of Treasury Letter.
361. Bills—Places of Religious Worship Registration (amended).
374. „ —South Sea and other Annuities Commutation (do.)

*Delivered on 23rd and 25th April.*
172. Railways—Returns.
347. Frome Election—Report from Committee.
348. Waterford Election—Ditto.
373. Committee of Selection—Sixth Report.
191. Local Acts—Reports of the Admiralty.
254. Coal Mines—Return.
344. Bounty to Recruits—Return.
349. Guildford Election—Report from Committee.
350. Rye Election—Ditto.
351. Wigton Burghs Election—Ditto.
365. Coinage—Account.
370. British Spirits—Ditto.
390. Encumbered Estates (Ireland)—Returns.
391. Encumbered Estates (Ireland)—Return.
367. Bill—Taxing Officers, Common Law Business—(Ireland).

*Delivered on 26th April.*
312. Libraries and Museums—Abstract of Return.
342. Select Committees—Return.
380. Bills—Sheriff Courts (Scotland), amended.
388. „ —Hackney Carriages (Metropolis).
392. „ —Entails (Scotland).

*Delivered on 27th April.*
203(1). Bridgnorth Election—Index to Minutes of Evidence.
322. Dartmouth Election—Report from Committee.
345. Tynemouth Election—Minutes of Evidence.
346. Newry Election—Report from Committee.
364. Tobacco—Return.
371. Exports to Turkey, &c.—Return.
393. Committee of Selection—Seventh Report.
397. Railway Acts—Return.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 22nd April, 1853.*

*Dated 23rd Nov., 1852.*
823. A. E. L. Bellford—Drying furnaces. (A communication.)

*Dated 8th March, 1853.*
584. S. L. Lister—Machinery for washing wool.

*Dated 12th March.*
625. N. A. E. Millon and L. Mouren—Treatment of corn and grain, particularly washing, drying, grinding, curing, and preserving them.

*Dated 16th March.*
656. E. Nickels—Lubricating matters.

*Dated 22nd March.*
698. S. M'Cormick—Manufacturing screws, bolts, &c., and machinery for same, &c.

*Dated 28th March.*
740. G. E. Dering—Preserving animal and vegetable substances.

*Dated 29th March.*
747. H. L. Corlett—Railway waggons.

*Dated 5th April.*
815. S. Flanders—Ploughs.
817. W. Pidding—Woven and other fabrics, and machinery for same.
819. T. Carr—Nails and other fastenings, and machinery for same.
821. W. Pidding—Preparation of twine, paper cuttings, &c., for ornaments.

*Dated 6th April.*
823. F. A. Gatty—Printing on textile fabrics.
825. H. Leachman—Manufacture of iron. (A communication.)
827. W. Radford—Construction of metallic braces, &c., applicable for shipbuilding.
829. W. Johnson—Safety paper. (A communication.)

*Dated 7th April.*
831. J. F. Heather—Pneumometer.
833. W. Morgan—Paper and cardboard cutting machines.
835. F. W. Mowbray—Preparing and combing wool, &c.
837. W. L. Bryan—Warming and ventilating.
839. R. P. Clark—Machinery for loading and unloading colliers and other ships.
841. L. J. Green—Axletree boxes.
843. W. Fuller—Ice-pails, &c.

*Dated 8th April.*
844. G. F. Goble—Safety-valves for steam-engines and gas chambers.
316. W. Moseley—New method of railway traction, called a Pony Railway.
847. G. Humphrey—Self-acting safety-valve.
848. A. S. Braden—Apparatus for roasting coffee, &c.
849. J. T. Pratoiel—Machine for doubling, &c., fibrous substances.
850. P. F. Flanagan—Manufacture of hats for yachting, &c.
851. H. O. Robinson—Machinery for crushing sugar-canes.
852. G. Herbert—Construction and mooring of light-vessels, &c.
853. J. Farrar—Treatment of flax, &c.
854. S. Taylor—Machinery for weaving seamless goods.

*Dated 9th April.*
855. G. F. Goble—Machinery to be actuated by air or water.
857. H. Taylor—Ornamenting surfaces. (A communication.)
858. A. M. A. Iglesia—Ornamental glass surfaces.
859. W. P. Cresson—Lathes for smoothing surfaces of certain metal wares. (A communication.)

*Dated 11th April.*
860. J. B. Gibson—Saddlery and harness.
861. J. F. Boake and J. Reily—Signal-posts for railways and apparatus.
862. R. B. Ruggles and L. W. Serrell—Machinery for beating gold, &c.
863. R. and J. Garrard—Improvements in bonnets.
864. W. Urquhart—Manufacture of printers' types, &c.

865. W. R. Palmer—Machines for application of horse power, called "Palmer's Improved Horse Power."
866. W. R. Palmer—Machines for threshing seeds, &c., called "Palmer's American Seed and Grain Thresher and Winnower."
867. H. Donald—Machinery for cutting and uniting metals.
868. W. M. Campbell—Earthenware kilns.
869. D. Nicoll—Garments and sewing the same.

*Dated 12th April.*

870. S. Russell and R. M. M'Turk—Metallic handles for cutlery.
871. H. Blake—Railway wheels.
872. R. A. Brooman—Grinding and pulverizing gums, &c.
873. A. Turiff—Preventing accidents on railways.
874. H. W. Harman—Steam-engines.
875. J. Taylor and J. and I. Brown—Manufacture of charred peat.
876. A. Mondollot—Filling vessels with aërated waters, &c.
877. D. Edwards—Signals for railways.
878. T. Greenwood—Evaporating saccharine fluids.
879. R. G. Pigot—Caltraps for military purposes.
880. F. F. Verdié—Welding cast-steel, cast-iron, &c.
881. R. J. Kaye and J. O. Openshaw—Motive power by electro-magnetism.
882. E. Cunnington—Decoration of furniture, panels, &c.
883. J. Smith—Suspending carriage-bodies.
884. A. V. Newton—Steam-boilers, and supplying same with water. (A communication.)

*Dated 13th April.*

886. N. Clayton and J. Shuttleworth—Portable and locomotive steam-engines.
888. W. Pearce—Construction of locomotive engines, &c. (A communication.)
890. J. Noble—Preparing cotton, &c.
892. F. Burden—Treatings rovings for spinning.
894. J. Noble—Preparing cotton, &c.

APPLICATIONS WITH COMPLETE SPECIFICATION FILED.

898. M. Robinson—Preventing accidents on railways. 14th April, 1853.
923. J. Dunning—Construction of coke ovens, 16th April, 1853.
929. W. W. Stephens—Application of retorts in gas and other ovens, to the process of improving iron and converting it into steel. 18th April, 1853.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 22nd April, 1853.*

488. Juliana Martin, of Soho-square—Invention of an improved apparatus for artificial hatching.
505. William Maclay, of Woolwich—Improvements in extinguishing fire in dwellings, factories, and other buildings, and in ships.

*Sealed 23rd April.*

531. Julian Bernard, of Guildford-street, Russell-square—Improvements in the manufacture of glass.
583. Richard Archibald Brooman, of 166, Fleet-street—Improvements in revolving fire-arms.
630. Henry Spencer and Edmund Taylor, of Rochdale, Lancashire—Improvements in steam-engines and boilers.
756. Francis Montgomery Jennings, of Cork—Improvements in preparing flax, hemp, China-grass, and other vegetable fibrous substances.
996. John Symonds, of Glasshouse-yard, East Smithfield, and George Mouchet, of Battersea—Invention of an improved mode of cleaning or sealing metallic surfaces.
1015. John Sheringham, of 24, Edwardes-square, Kensington—Improvements in the construction of stove-grates.
1048. James Bell, of Portobello, N.B.—Improvements in railway chairs.
307. John Perkins, of Manchester—Improvements in the treatment of certain bituminous mineral substances, and in obtaining products therefrom.
320. John Whitehouse, sen., and John Whitehouse, jun., of Birmingham—Improvements in the manufacture of knobs for doors and other like uses, part of which improvements is applicable to the manufacture of certain articles of earthenware.
388. John Bethell, of 8, Parliament-street, Westminster—Improvements in obtaining copper and zinc from their ores. (A communication.)
522. Edward Duke Moore, of Ranton Abbey, near Eccleshall, Stafford—Invention of an improved mode of treating the extract of malt and hops.
536. Samuel Colt, of Spring-gardens—Invention of an improved construction of blower. (A communication.)
538. Samuel Colt, of Spring-gardens—Improvements in rotating breech fire-arms. (Partly a communication.)

*Sealed 26th April.*

520. Claude Mames and Augustin Marion, of Regent-street—Invention of a new kind of damper for moistening paper and stamps.
524. Charles Rowley, of Birmingham—Improvements in nails.

*Sealed 27th April.*

590. William Petrie, of Woolwich—Improvements in the manufacture of sulphuric acid.
878. Thomas Charles Medwin, of Blackfriars-road—Improvements in water-gauges, or instruments for indicating the height of water in boilers.
1075. Charles Barlow, of Chancery-lane—Improvements in bleaching, purifying, and concentrating sulphuric acid, parts of which invention are applicable to evaporating other liquids.
47. Charles William Lancaster, of New Bond-street—Invention of an appendage to bullet-moulds.
135. Celestin Malo, of the firm of Malo and Company, of Dunkerque, France—Improvements in steam generators.
138. Peter Rothwell Jackson, of Salford, Lancashire—Improvements in the manufacture of hoops and tyres for railway-wheels and other purposes.
142. Richard Mountford Deeley, of Andman Bank, Stafford—Improvements in the grates of furnaces used in the manufacture of starch.
218. Thomas Symes Prideaux, of Garden-road, St. John's-wood—Improvements in the manufacture of iron.
357. William Ball, of Ilkeston, Derbyshire—Improvements in machinery for producing looped fabrics.
453. John Richard Cochrane, of Glasgow, N.B.—Improvements in the manufacture or production of ornamental or figured fabrics.
458. Reuben Plant, of Brierly-hill, Staffordshire—Improvements in safety-lamps.
459. Robert Milligan, of Harden Mills, Bingley, Yorkshire—Improvements in apparatus for washing slivers of wool.
469. Thomas De la Rue, of Bunhill-row—Improvements in producing ornamental surfaces to paper and other substances.
477. William Symington, of 41, Gracechurch-street—Improvements in preserving milk and other fluids.
493. Charles Tetley, of Bradford, Yorkshire—Improvements in obtaining power by steam and air.
494. Charles Tetley, of Bradford, Yorkshire—Improvements in the manufacture of bobbins.
501. Edward Hammond Bentall, of Heybridge, Essex—Improvements in harrows.
505. Samuel Cunliffe Lister, of Manningham, near Bradford, Yorkshire—Invention of heating and making cards.
507. Thornton Littlewood and Charles Littlewood, of Rochdale—Improvements in machinery or apparatus used in the preparation of wool, silk, flax, and mohair to be spun.
512. William Rowett, of Liverpool—Improvements in making paddle-wheels for vessels propelled by motive power, which is called, "The Cylinder Paddle-wheel."
515. Robert Lewin Bolton, of Liverpool—Invention of a new mode of obtaining and using motive power by explosion of gases.
517. Charles Henry Hall, of Liverpool—Invention of an improved apparatus for cooking by gas or vapour.
523. Lewis Jennings, of Fludyer-street, Westminster—Invention of an improved apparatus for regulating the speed of machinery.
535. Samuel Colt, of Spring-gardens—Improvements in rotating breech fire-arms. (Partly a communication.)
537. Samuel Colt, of Spring-gardens—Invention of improved machinery for forging metals. (Partly a communication.)
542. Thomas Crick, of Leicester—Improvements in the manufacture of boots, shoes, clogs, and slippers.
546. George Elliot, of St. Helen's, Lancashire—Improvements in manures.
552. James Boydell, of the Anchor Iron-works, Smethwick, near Birmingham—Improvements in the construction of bedsteads.
585. John Wright, of Camberwell—Improvements in the construction of bedsteads and other frames.
586. Alexander Samuelson, of Hull, Yorkshire—Improvements in the manufacture of bricks and tiles.
587. Frederick William Emerson, of Trereiffe Chemical-works, Penzance—Improvements in obtaining tin from ores.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| April 26 | 3454 | Clack-box and Feed-pipe for Locomotives | John Budge | St. Pancras. |

# SOCIETY OF ARTS.

## FRIDAY, MAY 6th, 1853.

## NINETEENTH ORDINARY MEETING,

### *Wednesday, May 4th,* 1853.

The Nineteenth Ordinary Meeting of the Society was held on Wednesday, the 4th instant, the Right Hon. the Earl of Harrowby in the chair.

The following Institutions have been taken into Union since the last meeting:

264. Epsom and Ewell, Literary and Scientific Institution.
265. Salford, Athenæum and Temperance Hall.

The Discussion was resumed on the Very Rev. the Dean of Hereford's paper, "On the Importance of giving a Self-supporting Character, as far as possible, to Schools for the Labouring Classes; and the Means of doing so."

Henry Cole, Esq., C. B., observed that the discussion had terminated the previous week with a question from Mr. Hinton as to the propriety of compulsory attendance at schools. That inquiry seemed to him to open a question beside the precise point of the discussion, which referred only to the self-supporting plan of education. He was not sure whether it might not be desirable, under some circumstances, to have a certain amount of compulsory attendance at schools, inasmuch as we had already such a thing as compulsory attendance in prisons; and it might possibly be desirable to use compulsion in education, to prevent that stage of the matter. In regard to the question of self-support, however, he thought every one would admit that Education, like everything else, must be paid for somehow; it might be paid for by the Government wholly, or by money obtained by means of the begging box, or supported on its own merits, as most things wholesome and worthy were. He would not express any opinion on this point, further than to say, that experience showed that whenever capital was found by one person, and managed by another, the thing did not work so well as it might do. In all cases where a business was managed by corporations, whether arising out of a central government, or out of parishes, or elected by shareholders, and indeed, wherever there was corporate authority, there appeared to be little feeling of responsibility, and things went wrong; as some one had said, corporations had no souls, and certainly they seemed to pay no penalty for their misdeeds. This had been strikingly exemplified a few years ago in the case of railway directors, in regard to the choice of whom the utmost freedom of election had been exercised, but that had not prevented them from doing wrong. In all these matters there was nothing like individual responsibility. Wherever Government attempted to do the whole business of education, and pay for it all, an element arose which was most prejudicial to success. Then there was the eleemosynary part of the consideration. In regard to that, he thought persons never properly valued a thing which was cheaper than dirt; they were always suspicious of it. True, a great deal had been done for education through the eleemosynary principle, and that was perhaps better than nothing. Educational charities were, he thought, relics of the past. In the old times, when people had left off fighting they began to accumulate money; and not being able to take it out of the world with them, they left it behind for some charity. Whatever had been their antecedents, however, the consequences were, he thought, unwholesome, and he did not think it wise to speak of them too charitably, or allow their origin to exempt them from being condemned. It had been his business, during the last year, to be connected with the Government schools of design, supported upon the principle of Government paying part, and begging for the remainder. An examination of the progress of these institutions showed that the results were not successful. It was found that in proportion as the Government was disposed to contribute, committees were disposed to inaction; that where the Government paid much, the localities did little. Last year the Board of Trade endeavoured to introduce a more wholesome state of things, and it was determined that no further schools should be founded on the principle of the Government subsidizing them. At that time two schools were about to be founded, which afforded a very fair experiment. One was in Limerick and the other in Waterford; both were cities in the county of Limerick, and both were agricultural towns, but Limerick contained about treble the population of Waterford. To the former 150*l.* per annum had been promised, to Waterford nothing. Now the result of the experiment at the end of one year was as follows: the number of students in each was about the same, but in Limerick the students cost, per individual per annum, 32*s.*, and paid per annum 25*s.*; whilst in Waterford they cost 15*s.* per individual, and paid 25*s.* Thus Waterford, a poor Irish town, was self-supporting, more so than any other in the country; whilst in Limerick, a richer town, with a larger population, the result of their subsidizing was to make them paupers and keep them so. Limerick was constantly begging for more, whilst Waterford, having nothing to gain by begging, depended on its own resources. In consequence of the success of Waterford, education in art had been extended to other places on the same principle of not giving any subsidy, but guaranteeing an income to the master. In Chester a school had been established which, from the first, had been self-supporting, and the guarantee to the master of 70*l.* a year would not be needed, as the income from students' fees would amount to 200*l.* In Hereford, also a school had been established on the same principle, and there they had had the able assistance of the Very Rev. Dean. In raising the capital for the first outlay, the Dean and Chapter gave them a donation, the first ecclesiastical authority in the country who had done so. The first outlay for fittings, examples, &c., amounting to 40*l.*, having been raised, he was told that the master would net 160*l.* the first year out of students' fees. The Dean wrote word to say that the instruction there given was popular amongst all classes, and there was no doubt that the institution would be in every way self-supporting; whereas had the Board of Trade offered them 200*l.* a year, and made the instruction *gratis*, it would have been a complete failure. This he regarded as a very happy experiment in favour of the self-supporting principle, inasmuch as the population did not exceed 13,000, and was purely agricultural. It was somewhat curious to mark the experiments. In the great manufacturing towns, where a profit was derived from the application of art, where they had already had large grants, they were constantly craving for more. From one town in the north, the Board of Trade had applications three times in one year to increase its grant of 600*l.* per annum. A few days ago he had an application from one town which had already a grant of 150*l.* a year, requesting him to ask the Board of

Trade to increase their grant to 400*l.* or 500*l.* a year, simply because of the importance of its manufactures, urging that as a reason why their workmen should be educated in art without paying for it. He told them in answer, that he thought it would have a more wholesome effect to take away their grant altogether. He had recently visited Manchester, and was told that they would never get 5*l.* a year out of the people there, for the support of a school of design. He referred them to the example of Chester, and did not hold out any hope of a grant from the Board of Trade. The result was there were now upwards of twelve schools organising themselves in Manchester, for teaching drawing. There was another most important point referred to by the Dean, namely, the propriety of making the schools attractive to those who were to get the benefit out of them; and in regard to this part of the question, he was reminded that schools for one class only were cut off from a fruitful source of income. There were several schools in London that were just able to pay their way—they were not quite self-supporting at present. In reference to this part of the question, he would here remark, that he looked forward to a time when education would be regarded as a commercial question, and when whatever was invested in a school would return five per cent; in the meantime, it would be necessary to pay the cost of founding them. The schools called Birkbeck schools admitted mixed classes; he was not sure, however, whether they made each class pay according to its means, but thought they charged one uniform price. Now a uniform price to meet the abilities of the poor, would, he thought, be fixed at a far lower average than it ought to be; and the advantage was lost which might result from making the different classes pay according to their means, besides the mischief of too low rates. When he entered on his present office, amongst other branches of their Institution, they had a school for females, in Gower-street. It was miserably placed as regarded finances, costing some 600*l.* or 700*l.* a year, and realizing only about 50*l.* The thing appeared to him degrading; ladies were receiving instruction worth 10*s.* or 1*l.* 1*s.* a lesson, for which they were paying at the rate of 1½*d.* for a lesson of three hours. The rooms were nicely carpeted, and so comfortable, that they would have been cheap to sit in at that price. They had the best models, the best examples of antiquity, and the best designs of modern art. They had materials found them; and in the season, they had peaches, pine-apples, &c., to paint from; and yet, after all this, the ladies did not think themselves treated well, because Government did not pension them; as for having any notion that they were under any obligation, it had not entered their minds, although not a few of them came in their broughams. The first thing he did was to increase the fees; and the result was, that from 70 pupils, realizing 55*l.* a year, in less than nine months they had 190 pupils, realizing 300*l.* a year. They were much more diligent pupils, and much more eager to come to the school. There was another class in the school for wood-engraving; they met twice a week, and paid 2*s.* per month. The pupils in this class he entreated not to regard it in this *dilettante* fashion, but to come every day, at the same time increasing the fee to 10*s.* per month. This experiment was also successful, and the number of pupils had increased one-third. The Rev. Dean had referred to the question of the propriety of the Society of Arts taking up the subject of education. It seemed to him that the Society afforded an excellent opportunity of trying this self-paying system. They would be able to try to instigate the giving of a good education free from those unhappy differences about pins' points; for as regarded art education, there could arise no question of creed or denomination—all classes were willing to receive it and to pay for it. He had received, for instance, in one week, expressions of a desire for art education from a bishop of the Established Church, from a master of a training school, from Cardinal Wiseman, and from the Jewish Rabbi. It appeared to him, that the Society could have no better mission than to try to find out those points of education which all classes were anxious to have, and to bring them before the public in such a manner as might best secure their promotion.

Dr. LATHAM remarked, that to discuss the general question of the self-supporting character of educational establishments like those indicated by the Rev. Dean, would be a mere waste of breath, for their self-supporting character might fairly be assumed. He would make a few observations, therefore, on the question proposed last week by Mr. Hinton as to the propriety of compulsory attendance, and also to the question briefly touched by the Dean regarding the time when, in agricultural populations, the children were inclined to leave school. There was a striking connection between those two questions. In regard to the school which the Dean had described, no questions could be raised—it was a *fait accompli;* but still the consideration arose as to the possibility of applying the same system to other parishes, agricultural and manufacturing. But the great difficulty to himself was that just suggested. It was easy to say that 2*d.*, or 3*d.*, or 4*d.* a week could be paid by the working man for education; but the question which he laid stress upon was, How could the labouring man pay 3*s.* 6*d.* or from that to 6*s.* a week for the education of his children? Now, it was a fact, that in agricultural districts boys of from six to eight years of age could earn, by weeding, 6*d.* a day—so that, in fact, to send them to school was paying 3*s.* a week each instead of 3*d.*; and it was mere verbiage to talk of 2*d.*, or 3*d.*, or 4*d.*, or 6*d.* being the price of their education, when it also involved the forfeit of their possible earnings. And, moreover, he believed that the whole tendency of agricultural improvements was to give increased value to juvenile labour. He confessed he knew but few alternatives in this difficulty; one was suggested in the question proposed by Mr. Hinton—namely, the compulsory attendance at school of the juvenile population. He should like to know, also, how far the Dean considered the mixing up of the two classes—the children of the employers and the employed—would have the effect of tempting the sons of the latter to school. This, he apprehended, might probably have as beneficial an influence as Government compulsion. It was rather his object to call attention to the difficulties than to pass any opinion; and he would take leave of the subject by again indicating the connection between Government compulsion and the inducement offered by the mixing of the lower with the higher classes of children.

Mr. ALEXANDER CAMPBELL remarked that the question was one not second in importance to any other, inasmuch as on the good education of the people depended the wealth, industry, morals, and permanent prosperity of the nation; it was therefore the vital question of the age. If he was right in his appreciation of the subject, he would endeavour to show that if it were properly taken up, first by the Government, then by the people, and then by those who wished to be educated, education might be self-supporting. But he would lay it down as a political and social axiom, that if there were one duty more paramount than another, it was that Government ought to apply the national resources to the education or well-development of the people. They were told crime was increasing; that Government was bound to protect the people, both externally and internally—externally, by armies, navies, &c.; but if they forgot the education of the people, it would be little consequence how well they were guarded against external foes. He thought it a true theory, that every encouragement should be given to voluntary education, and that Government should be impressed with the necessity of applying national resources to it. Capital was required to commence, and who so proper as Government to supply it? If the people were compelled to support an army and navy, surely it was as necessary to support an army of schoolmasters; they were the true guardians of the people. Then in regard to the principle of self-support. He was a member of the first Mechanics' Institute in the world; it was established in Glasgow by Dr. Anderson, and he knew that to this day the mechanics of Glasgow would pay to the full extent required for necessary expenditure. There were other branches of education more required than mere artistic education; industrial education was required, if they wished to have superior mechanics and artizans. Something had been said of the impossibility of the agricultural labourer supporting education, and the last speaker had referred to the loss of 6*d.* a day being involved in the children's attendance at school. That was true: almost every working man required what his family could earn in order to gain the necessaries of life; but still, taking children on an average from five to fifteen years of age, they were competent not only to pay for their own education, but for their own maintenance as well. He had seen it done; he had seen them digging and weeding their gardens and raising food, paying for their education, and making their own clothes. He felt satisfied that if this Society would take up the question of education, and promote inquiry on the subject, education would not only be better attended to, but capital would be found; and if properly applied, the results would benefit not only the person who found such capital, but the nation at large. He had that day been reading a report from the state of New York on the subject of education, and from it he learned that the state contributes not less than a million sterling annually for educating the people. There a certain portion of land was laid aside for the purposes of education in connection with the formation of every township. As an investment for capital, however, if the thing were properly gone into, he believed it would pay better than any railway in the kingdom.

Mr. WILLIAM ELLIS, of Camberwell, who was introduced by Dr. Booth, as a gentleman practically engaged in the work of education, and indefatigable in his efforts on its behalf, remarked, that it was unquestionable that the greatest part of the education of this country was at the present time self-supporting in its character; and with all its short-comings, he thought no one would wish to see it conducted differently. What had the Dean proved? He had shown them a great fact; he had gone into an agricultural parish, where difficulties abounded, and by his zeal and activity had established a school, and had left it supporting itself, so far as current expenses were concerned. His efforts had been imitated in other places, and the gentleman who succeeded him in the parish had been converted to his views. Then, if that had been done in one parish, and followed by two or three more, why not in others? Was there anything peculiar in the parish or the county, or anything favourable in the circumstances? Or was not the peculiarity in the Rev. Dean—his mind overflowing with intelligence, and his heart with benevolence? Was it not that he practically lent himself to the work, countenancing, by his example and by years of effort, the bringing together of the various classes to receive a superior education? Almost everything in the country was done on self-supporting principles; but the great merit of the Dean's system was, that he had enabled the lower classes to partake of the superior education thus established on self-supporting principles. He wondered whether any part of this success was owing to the superiority of the education given, which enabled some of the parents not only to give the few pence a week for education, but also to forego the sixpence a day for bird-frightening or weed-gathering? He hoped he was not trenching on dangerous ground, when he asked how it was that the Dean had so few fellow-labourers? He thought there must be many contemporaries educated where he was, who must be in the world doing something. Was it owing to what the Dean brought from college, that he had achieved so much, or was it owing to what he had thrown off? Much of the neglect of education had arisen out of the utterly useless character which belonged to tuition at many schools; instead of teaching how to go on in the world, and training to follow in the right direction, it had been too often mere acquirement of rote-knowledge in utterly useless subjects. Persons who talked of State-education forgot how much that implied. That education, in point of fact, embraced the questions of how to feed, house, and clothe a family; and that if the State undertook the education of the people, it might undertake the feeding, lodging, and clothing of them, as well as instructing and training them. In regard to compulsory education, if it were necessary to answer that question, he should say, that if he saw a child in a gutter, and knew no way to save it from perdition but education, he would compel it to be educated. But that was a question quite unnecessary at present; there was a world of work to be done first. They had got, as Dr. Chalmers had observed, to invade ignorance, and overcome it. There was another consideration closely allied with the school education of children; he meant the home influences they were subjected to. He remembered one work issued by the Dean, which had made a great impression on his mind; it was that in which he referred to a cottage of one room being the dwelling of a family, so that it was impossible to preserve the common decencies of life. The State could not rectify these things; it was the work of the people themselves assisted by those energetic, able, especially-appointed and qualified men, who were to assist their generation in emerging from a lower to a higher state of civilization. He would read an extract from a paper going over similar ground, but more succinctly:

"Is it desirable that the children of these realms, on leaving the schools at which they have been placed by their parents, shall have obtained thus much of instruction, as to find themselves acquainted with the general principles on which the industrial efforts of all must be conducted; and with an outline of the arrangements which have been adopted, and under which they are about to engage? It is desirable; but it is yet to be desired. Moreover, it is attainable; but such is the barbarous state of the prevailing education that it is still far from being attained."

After a few remarks on the division of labour, the writer proceeded:—

"The unfolding of all this knowledge, and of the principles and practices of industrial employment, to the young in our schools will enable them clearly to see how fatal the mistake must ever be to all interested, especially to the labourers, if they should endeavour to set themselves up as dictators to their masters in respect of methods and contrivances, and distribution of time and service in the conduct of business. Should the young workman feel in himself the germs of a superiority over those whom he serves, he may use his efforts to persuade, and to recommend improvement, and he may shift from an incompetent to a less incompetent employer; and ultimately, he may avail himself of the opportunity of applying his own superior arrangements on his own account, and with his own capital, careful at each step to fulfil every engagement with fidelity, and to bear in mind throughout that the labour of the workman, when sold for wages, is the sole property of the capitalist who has bought it.

"Marvellous, indeed, will be the improvement of our social state, when the young shall leave our schools imbued with all the feelings that cannot fail to accompany the kind of knowledge which, we so earnestly contend, ought not to be withheld from them. A few schools have proved that this knowledge may be easily communicated; and what can be done in a few schools, can be done in others, if those who hold the reins there are competent to guide in the right direction. Who, then, are the real holders of the reins? We will close our present paper with an attempt to answer that question.

"The power of deciding in which among all existing schools the young shall be instructed, is invested in their parents. The power of seeking and of creating a demand for something better than what existing schools afford, is also invested in parents. The power of enlightening ignorant parents, of confirming the hesitating, and of awakening the inert among them to a keener sense of duty, is invested in that large body of accepted teachers,—the clergy of all denominations; and that other small body of self-appointed teachers, who, being in advance of the age, struggle to make their proffered instruction acceptable to as many parents as possible. The government of a country, so far as they are considered in the character of creators, and not of creatures of public opinion, may also be enumerated among those who act upon parents, or supply the place of parents.

"We have already shown how far the Committee of Council on Education have proved themselves equal to the task of improving and extending the attainments of schoolmasters, so as to render them more efficient in obtaining for those who come under their instruction a fair prospect of participation in the blessings of our advanced civilization, and of security against the imminent danger to which all are exposed who do not know how to conform to the rules of industrial discipline. Are the clergy, as a body, more competent to discharge their duty in these respects than the Committee of Council? Or are they so distressingly behind the Council as to torment its members, who really are anxious for improvement, with their stubborn opposition to all innovation, and with their callous insensibility to the higher calls of duty? Have we any hopes of amendment in the next generation of clergymen, from the style of education which they are now receiving at *the seats of learning?* Or are the principals and professors in these seats of learning intent upon confirming the people of this country in the belief of what they are already beginning to suspect—that they are destined to advance in civilization, not only without University assistance, but in spite of University resistance?"

He would not add another word to diminish the effect of what he had read; but, as the Rev. Dean had remarked, a little practice was worth a great deal of talking. If the Society would take the matter up, and try to carry it out as expressed in the letter which it had recentl issued, he could promise to procure them a large amoun of pecuniary support, and give a little of his own tim and labour into the bargain.

**Edward Baines**, Esq., remarked that, so far as h could learn, there was a general opinion prevailing th the principle brought forward by the Very Rev. Dea was the true system of education, both as best sustainin the self-reliance of the people, and as actually best calculated to produce the end desired. Mr. Cole, with man of whose remarks he entirely agreed, threw out a doub as to the original providing of the capital. The opinio of Lord Brougham, in his Report on Education, wa that if schools could be provided, there would be no difficulty in supporting them afterwards. But what he (M Baines) wished to prove to demonstration was, that th people would supply the original capital, as well a maintain the schools. The first fact was one in whic Mr. Campbell would feel interest. He was present himself in London at the first meeting of the London Mechanics' Institute, in 1824. They had now in his ow county, Yorkshire, 120 Mechanics' Institutions, comprising nearly 20,000 members, all provided by the peopl themselves. There were, in the United Kingdom, abou 700 Mechanics' Institutes, with not less certainly tha 110,000 members. These, he thought, were stron assurances that the people would provide both origina capital and subsequent maintenance. The question o education had lately been discussed in Manchester. Th Rev. Charles Richson, the author of the local plan o education in Manchester and Salford, gave this evidenc before a Committee of the House of Commons: he said there was no want whatever in the people of power t build schools to any extent required in Manchester. He also proved the very gratifying fact that there are now in Manchester and Salford no less than 172 public schools, and that of these, 110 schools, containing accommodation for 43,146 children, had been built between the years 1834 and 1852. In these 172 schools there was accommodation for 73,000 scholars, more than three times as many as were to be found in all the schools. He offered these facts to Mr. Cole to show how the people were providing capital for commencing, as well as means for carrying on schools. Of these 172, only 19 received building grants from Government, the total amount of which was about 8,300*l*. Nor was it in Manchester alone, but throughout the whole country, similar facts would be seen. A statement had been recently made by Lord John Russell on the state of education in this country in March, 1851. There were, he said, in the day-schools of the country upwards of 2,108,000 scholars, being 1 scholar to 8½ inhabitants; but through the deficiencies of those returns, the proportion was not stated quite accurately, the truth being that there was 1 to every 8¼ inhabitants. Sir J. Kaye Shuttleworth had stated, that it was the opinion of the most eminent statistical authorities that 1 in 8 was what might be reasonably expected as a fair proportion. The state of education so far back as they had any returns was very different. The Report of Lord Brougham's Committee in 1818 gave the number of scholars in day-schools as 674,000, or 1 scholar in 17 inhabitants. Lord Kerry's Committee of the House of Commons in 1833 reported that there were 1,276,000 children attending in day-schools, or 1 scholar in 11¼ inhabitants. The Registrar-General now reported that the number was 2,108,000, or 1 in 8½ inhabitants, though he (Mr. Baines) believed it to be 2,150,000, or 1 in 8¼ inhabitants. The increase of population from 1818 to 1851 was at the rate of 57 per cent., whilst the increase of day-scholars was at the rate of 212 per cent. All this was independent of what had been done in Sunday-school education, which originated in 1782. They would find, he believed, that the total number of Sunday-scholars amounted to about 2,500,000, taught by 300,000 voluntary teachers, the proportion of scholars being about 1 in every 6 of the classes who send their children to Sunday-schools. He thought this would show Mr. Cole that the people had found capital. They were perfectly aware that Lord John Russell had said that, fifty years ago, there were no public schools for the poor except Sunday-schools. That was true in 1805, when Joseph Lancaster, together with the Duke of Bedford, began to multiply schools on their system; at that time there were no public unendowed schools, with the exception of two or three in the Borough-road. In 1818 the number was 861; in 1833 the number was 5,724; and that was before Government had advanced one penny towards building schools, or assisted in education in any degree. The number in 1851 was 11,367; so that the increase before Government aid was at the rate of 565 per cent; and after the Government Grants, only at the rate of 199 per cent.; the earlier increase being 44 per cent. per annum, and the latter increase only 11 per cent. per annum. He asked, was it possible to doubt the power of the people to provide their own institutions after such evidence? If the people were thrown on their own resources, they would rise and meet the case; not perhaps suddenly, any more than summer would immediately succeed winter. A spring time there would be, and it might appear cold and backward, but the movement was progressing, as surely as the spring would be succeeded by summer. The Dean had done great things, worthy of all honour; but others too had done likewise. The Rev. B. Parsons, of Ebley, near Stroud, had conducted a school somewhat similarly, to which one poor widow, earning seven shillings or eight shillings a week, had sent seven children, and kept each there on an average seven years. Another fact he would name—the people of this country spent 57,000,000*l.* in intoxicating liquors and tobacco, or at the rate of 4*l.* a head per annum; whilst 2*d.* a week for education would be only 8*s.*; 3*d.*—12*s.*; and 4*d.*—16*s.* per annum. The result of his observation—and he had long been a practical educator—was, that a self-supporting system was infinitely the surest and the noblest system; they did not need the aid of Government, which would only degrade them, and stereotype the character of education. All the Government improvements in education had sprung from private systems, and had been adopted by the Government inspectors.

Mr. Shiel, a teacher in one of the Birkbeck schools, after some remarks on the general subject, and the sad lack of education which still prevailed, remarked that voluntaryism had had a fair trial, and was manifestly unequal to the task. If it could educate the people and would not, was it not high time that it should be superseded? if it could not do so, then let it stand by and not object to other systems trying to effect what it had failed to do. He also referred to the inefficiency of the voluntary Normal schools, and their neglect of scientific training.

Mr. Harry Chester would confine his remarks to the question to which the Dean had alluded regarding the propriety of the Society of Arts discussing the subject of education. The charter of the Society stated that it was for promoting Arts, Manufactures, and Commerce, and he thought that no one would say education was inappropriate who remembered the year 1851, and how completely commerce was then shown to be dependent on education. In regard to the discussion, he thought it was certainly not the intention of the Society to have provoked controversy as to the general question of national education, and it might do mischief to the Society if they were to allow it to become the arena of political debate. The Dean of Hereford had made great triumphs in some specific points of grave importance. He had proved that a good education was, in the long run, cheaper and easier to maintain than a bad one; that in order to constitute a good education, it was necessary to impart the elements of science; he had brought it down in a way suited to the capacities and tastes of children in the lower walks of life, and proved that if a good education was put before the people, parents were willing to make great sacrifices that their children might obtain it. He had proved that the children of the labouring man might be educated in the same school as those of the middle classes, to the benefit of both. He had proved that the latter might obtain a better education than they had been in the habit of doing, without increased cost. In regard to the statistics of Mr. Baines, he would not enter into the argument further than to say that he entirely dissented from his conclusions, and that the example of Mechanics' Institutes was quite beside the case. Another point he wished to name was his regret that charges and imputations had been thrown out against the clergy and the Universities, and that, too, in the presence of the Dean, who was one of the brightest ornaments of both. He was convinced that no class in this country made greater efforts for the education of the people than the clergy of the Established Church.

The Rev. J. Howard Hinton said, in regard to his question as to compulsory education, he was content to let it stand where it was, without further remark. He agreed with Mr. Chester as to the impropriety of insinuations in discussions of this nature, and regretted that Mr. Shiel should have endeavoured to cast imputations on Voluntaryism and its Normal schools. He would conclude by asking Mr. Shiel whether it was not the fact that the Birkbeck schools were the result of the voluntary system?

The Chairman said, that though he did not quite agree with Mr. Baines, he rejoiced to think that his was the prevailing sentiment of the country. He did not like the idea of resigning education entirely into the hands of the Government. It was to be observed, however, that voluntary efforts had been greatest since the Government began to give aid; and he hoped for the best effects from the combination of the two powers, as it was important to remember that progress was best obtained by antagonism. Government aid might be required in some places, and not in others; as schools might be self-supporting in one place, and not in others. Where the means of self-support were not to be found, they ought not to refuse extraneous aid.

The Right Rev. the Bishop of Lichfield rose to propose a vote of thanks to the Chairman, which was carried by acclamation.

It was announced that at the next meeting, on May 11th, a paper would be read, by the Rev. W. Towler Kingsley, "On the Application of the Microscope to Photography."

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⁂ Any Member wishing to possess a full account of the Very Reverend the Dean's paper, may have a copy on application to the Secretary.

## RESIGNATION OF THE SECRETARY.

At the meeting of the Council on Wednesday last, the 4th instant, Professor Solly stated, that in consequence of the heavy correspondence which would devolve upon him in the formation of the collections proposed to be undertaken by the Society of Arts, in the Second Report of the Royal Commissioners for the Great Exhibition, it would not be possible for him to continue the Society's Secretary; he should, therefore, not propose to offer himself as Secretary at the next election, on the 6th of July.

## NOTICE TO INSTITUTIONS.

The Commissioners of National Education of Ireland have determined, at the request of the Council, to present a complete set of their Annual Reports, seven in number, to each of the Institutions in Union.

The Board of Trade have also announced their intention to distribute, gratuitously, to the Institutions, a copy of the First Annual Report, for 1852, of the Department of Practical Art.

## APPLIED SCIENCE AT OXFORD.

The following important series of questions have been recently printed and circulated by the Tutors' Association at Oxford. They are of peculiar interest at the present time, when the subject of collegiate instruction and University reform is exciting so much attention, and when the proposed erection of museums, lecture-rooms, laboratories, observatories, and workshops, on a large scale at Oxford, as a part of the educational machinery of the University, is under discussion:

### UNIVERSITY.

1. The Government of the University, and the constitution of the Initiative Board?

2. The advantages or disadvantages of the present comprehensive nature of a University education, that is, of an education based on Classics and Mathematics, with the addition of Divinity, Philosophy, History, Logic, &c., and requiring a combination from the student of all or several of these up to the final examination? The modification of it proposed by the University Commission, viz., the appropriation of the last year of undergraduateship to special studies? [see Report of Oxford University Commission, p. 72] The division of subjects proposed by the Commissioners at the final examination? The propriety of any other division?

3. The expediency of attaching honours to all the schools at the final examination, and to both or either of the moderation schools?

4. University Extension.

Do you consider that any practicable modification of the present system would render a University education useful or attainable for young men who are intended to become bankers, merchants, physicians, surgeons, engineers, solicitors, clerks in public offices or elsewhere, booksellers, chemists, &c., &c.?

At what age, in any of the above professions, do young men begin and end their professional education? Taking all the various avenues to professional success into account, could an Oxford education, however modified, be made to repay them for the inconvenience of deferring their start in life? If so, at what age should such an education begin and end, and to what sum should its expenses be reduced?

In case you consider a University education, however modified, impracticable in the above cases generally, will you state whether you consider any modification of it would attract the higher trades and professions, that could afford time for a longer preliminary education;—specifying which, and whether these could supply any considerable number of students to the University?

The resources in the University for educating an increased number of Clergy?

The best mode of providing accommodation for a larger number of students?

5. Professional Education.

Could the University give a professional education to young men intended for medicine, law, &c., without wholly dispensing with the present general course of study? In case this accommodation were thought necessary, by what arrangement could the University make it without the risk of lowering the superior education now given to those who have time and means for it, and thus abandoning the function of keeping up a high educational standard through the country? The expediency of retaining the present course of study for the Arts degree, of admitting orders of students into the University, who should not study with a view to that degree, but in special or professional lines, and for a degree or other testimonial in such lines?

If you consider that a professional and a general education can be combined, will you state in what way? The advantage of the plan proposed by the University Commissioners? [see Question 1.]

The fact of large established schools of professional instruction in the Metropolis and other places, and its bearing on the prospects of the University as such a school?

6. The admitted want of a preliminary professional education in the higher department of the Law [see Evidence to Report, p. 198], and the advantages of the University as a means for supplying this?

7. The best mode of promoting a more systematic study of Theology at the University?

The comparative advantages of the University and of Diocesan institutions, as places of preparation for Holy Orders?

8. The use of a professoriate for the purpose of teaching, and also as a means of retaining men of learning in the University? The studies for which professorial teaching is most adapted? The studies which, according to the existing state of the University, principally call for it? The degree in which the combination of the professorial system with the tutorial is advisable, and the plan and arrangements by which it could be effected. The regulations by which Professorships may be guarded from degenerating into sinecures?

9. Whether a board or delegacy for the supervision of studies is wanted, and how it should be constituted? The Professorial Board for the supervision of studies and appointment of Examiners proposed by the University Commission?

10. The best mode of appointing the Professors and Examiners; and the respective merits, for this purpose, of the Crown, Convocation, Chancellor, Vice-Chancellor, Proctors, Faculties, Boards within and without the University, as appearing from past appointments and other considerations?

### COLLEGES.

1. The general considerations which regulate the obligation to observe the intentions of Founders? The removal of this obligation in the case of some of these intentions, and its continuance in the case of others?

2. The objects for which Colleges were founded; their

respective weight in the Founders' minds; the scientific object in particular, its largeness and the extent to which it was comprehensive of whatever branches of knowledge had attained importance in the days of the Founders?

3. The eleemosynary designs of the Founders of Colleges, and the shape in which they could be most effectually fulfilled consistently with altered circumstances, and the habits of the present age? Ought the restriction of Fellowships and Scholarships to poor persons to be retained? If retained, how ought they to be modified, and what provisions can be recommended for carrying them out without prejudice to the educational functions of the Colleges? The nature and amount of the property test by which Fellowships should be guarded? The desirableness of new Exhibitions or Scholarships for poor men? Their suitable value, and the length of time they should be held? The regulations by which attention to the claims of poverty could be best secured in those cases in which it might be prescribed?

4. The condition and characteristics of the old class of *pauperes scholares*, their rank in society, numbers, treatment in the Colleges and University, and general history?

5. The religious designs of the Founders of Colleges, in regard to the promotion of the Christian religion, the strengthening of the Church, and education of an efficient Clergy? The purpose for which the condition of Holy Orders was annexed to Fellowships?

6. The local preferences of Founders and Benefactors, and the grounds on which they appear to have been made? Is any difference to be observed in the *animus* of them in different cases?

7. The relation of the Colleges to the University, and whether the former have contracted obligations to the latter in consequence of various privileges, especially the privilege they have enjoyed since 1636, of being the sole channel of admission into the University? And, if so, the nature and extent of those obligations? (See Report, p. 45, 179. Evidence, p. 131, 158, 214).

8. Do you consider Parliamentary interference with the College Foundations right and desirable? And, if so, upon what grounds, and to what extent?

In what mode could the Legislature most safely and constitutionally interfere for improving the efficiency of College Foundations—by direct general legislation, or by enlarged powers of correction to be exercised separately in the several Colleges by Commission from the Crown—together with enlarged powers, under proper checks, to the Colleges themselves to adjust their Statutes to the present wants of society?

9. The desirableness, on the supposition of Parliamentary interference, of the following changes:

Abolition of all oaths imposed by College Statutes, and especially oaths or promises to observe the Statutes, or declarations against change in the same?

Removal of the local restrictions upon Fellowships and Scholarships?

Removal of the obligation of Fellows to Holy Orders?

Enforcement of an examination test as the exclusive ground of election to Fellowships and Scholarships?

Appropriation of College revenues to University purposes, such as the endowment of Professorships, either by annexing them to Fellowships in certain Colleges, or by a tax on Colleges?

The appropriation of some Fellowships to particular branches of knowledge?

The expediency of limiting the tenure of a certain proportion of Fellowships?

The enforcement of the condition of study in the case of permanent Fellowships not held in connection with tutorial or other College employment? The regulations by which this could be effected? The desirableness of the condition of residence in the case of such Fellowships?

10. The Church interests involved in the proposal to apply College revenues to the maintenance of University Professors, and to remove from Fellowships the condition of Holy Orders? In what way could the Church receive a more certain pledge for the Church-membership of such Professors, than that which is afforded by the present connection of the University with the Church?

11. The expediency of some alteration in the present Visitatorial system, with a view to its greater efficiency?

### PHYSICAL SCIENCE.

1. At what age do young men generally begin the study of physical science and attendance on the lectures in that department?

2. The principal professions and practical objects with a view to which the study of physical science is pursued?

3. What constitutes the University education of a medical student,—stating the courses of lectures, the order in which they are attended, and the length of time they take up?

4. Will you state fully and particularly the advantages which a University in a metropolis has, compared with a University in a provincial city of average size, with respect to hospitals and the general means of experiment and illustration in physical science, apparatus, specimens, &c.?

5. What proportion of students in physical science attend regularly other courses of lectures in classics, moral philosophy, divinity, &c.?

6. Are you, or not, of opinion that for the effective encouragement of physical science, and in order to attract students in it to the University, it would be necessary to separate it from the University *curriculum*, and allow it to be pursued by itself?

7. Do you consider that the permission to devote the last year of undergraduateship to physical science would draw to the University either professional students or others to whom such knowledge would be useful, for the improvement of landed property or other objects?

Can you suggest any arrangement by which the University would be enabled to educate scientific men?

8. The value of physical science as a branch of liberal education, and for the general purpose of mental training and development?

### AMERICAN PARLIAMENTARY PAPERS.

As the distribution of Parliamentary Reports has lately occupied the attention of a Committee of the House of Commons, and as a good deal of interest has been expressed on the subject in all parts of the country, the following account of the distribution of papers printed in the United States, by order of Congress, is extracted from a letter recently received from Mr. Stansbury:

The papers presented to Congress are almost always printed in octavo; or if a larger size is required, on account of plates, or other illustrations, they are printed in quarto; and a complete Index of all which are published is printed at the end of each session.

The number of copies printed depends upon the importance of the document. The smallest number is 1,500: but of those which are considered by Congress to be important, and which it is therefore desirable to make widely known, from 10,000 to 100,000 are printed. These documents are never sold, the whole of them being distributed gratuitously at the cost of the State. Copies are in the first instance sent to all members of Congress, and it is understood that they shall re-distribute them in the states which they severally represent. Copies of all public documents are also deposited in the State Libraries of each State; and it has for some time been the custom to send them to the various Government departments and bureaux; the department through which the report comes usually receives a large number of copies for distribution; and in the case of individual reports, the authors frequently receive a few hundred copies.

It follows from all this, that the State papers, and other printed Government documents, are to be found in almost every public library in the United States, and there are a great many libraries of this kind; but from the large number distributed, and the manner in which it is done, it also necessarily happens that many of the papers are sent to those to whom they are utterly useless, and, consequently, that a considerable portion is eventually sold as waste, and destroyed; whilst, from the fact that they are not to be purchased, it frequently happens that those who really want them, sometimes find it difficult to obtain copies for their own private use.

Formerly the public papers were printed by contract, the work being entrusted to the lowest bidder. This led to very inferior work, and yet produced severe losses to the contractors, which Congress felt bound in equity to make good. Recently a public printer has been elected, and the charge of the whole work is now vested in the Superintendent of Public Printing, who is forbidden by law to have any interest in it. The yearly expense to which the Government is put by the printing of public documents is about 100,000*l.*

## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

INSTITUTION OF CIVIL ENGINEERS, May 3rd, 1853. —J. Simpson, Esq., Vice-president, in the Chair. The Paper read was "A Description of the Chesil Bank, (Portland)," by Mr. J. Coode, M. Inst. C. E. After describing the position, extent and form of this vast accumulation of shingle, the author stated that it had been generally supposed, that the nucleus of the bank was formed of a mound of clay; repeated trials, by boring, had, however, shown that the bed on which the shingle rested, on the east, was the edge of the Kimmeridge clay of the east bay; and it was only on that side that it could be reached by boring tools. The bank consisted in reality of shingle, mixed in places with sand, and so compact as to prevent the percolation of water, except during heavy gales from the south west, notwithstanding that at certain times the tide rose nearly three feet higher on the west than on the east side of the bank, and in heavy gales the waves ran up the slope as much as ten feet vertically. The largest shingle was generally found "to leeward," or farthest from the point whence the heaviest seas proceeded; and so clearly was this defined, that a Portland fisherman was popularly said to be able to distinguish, in the darkest night, any precise spot of the beach, "by the size of the pebbles." The shingle composing the bank consisted chiefly of chalk flints, with a small admixture of pebbles from other formations. The question was next discussed, as to the power by which shingle was conveyed from a distance of between forty and fifty miles, and deposited in the form of a high mound. The action of tidal currents was carefully examined, and after admitting that they did sometimes modify the extent and form of accumulations of shingle, and referring to the late Mr. H. R. Palmer's paper "On the Motion of Shingle Beaches," additional reasons were given, against the sufficiency of this tidal action to produce such results. Instances were then cited, of shingle travelling in opposition to the prevailing current or tide, and having shown, that the progress of the shingle could not be attributed to the action of the tidal currents, the effect of the wind waves was attentively considered. The prevalence of west and south-west winds on that coast was demonstrated, and it was shown, that lines drawn across the bay, in the direction of the heaviest and prevailing winds, would intersect the points whence the shingle had evidently been derived; it was shown also, that the seas driving along the west side of Portland, sufficed to arrest the progress of the shingle, and the evidence adduced led irresistibly to the conclusion, that the ultimate movement of shingle was always found to be in the direction of, and never against, the drift of the heaviest seas; but frequently in opposition to the prevailing tidal current. The formation of the gullies, or "cans," in the face of the bank, caused by the partial percolation, was then noticed, as tending in some degree to produce the flat slope on the east side. Mr. Palmer's views as to the "accumulative" and the "destructive" action of waves, were then examined, the Author's observations inducing him to fix other limits; the rule, so far as one could be formed, being in his opinion, that seven, or any less number of waves per minute, induced the "destructive' action, and nine, or any greater number, in the same time, the "accumulative" action; it being admitted, that shingle always accumulated with off-shore winds, and was scoured off during on-shore winds, and especially by the subsequent ground swell; bearing in mind, however, in watching the course of the crest of the wave, after breaking, that if it fell upon the water of the preceding wave, then returning down the slope of the beach, (as was the case when waves followed in quick succession,) the "accumulative" action was going on; but if the water descended directly on the pebbles, (as when the waves broke at longer intervals), the "destructive" action was progressing. The rapidity with which the water ran off, or was absorbed, would influence the result, and that was to some extent contingent on the slope of the beach, and also on the nature and degree of compactness of the material of which it was composed. The Paper concluded with some instances of the effects produced on the Chesil Bank, by heavy gales from the south west.

ROYAL SCOTTISH SOCIETY OF ARTS.—The Society met in their Hall, 51, George-street, on Monday, March 28th, 1853; Professor More, F.R.S.E., in the chair. The following communications were made:—1. Suggestions for the Prevention of Railway Accidents arising from Collision, by Mr. J. Stewart Hepburn. The author stated, that one cause of these accidents was the defective means of rapidly transmitting notice along the line, by signals, of any stoppage that occurred by the breaking down of a train, or otherwise; and he suggested, whether the electric wire might not be made the means of conveying an instantaneous signal of danger along the line between the two nearest stations to where the stoppage occurred. The author suggested that, at each angular bend of the line, elevated "danger" lamps might be permanently fixed up, covered on each side by day with a mask (removable at night), and having the established danger *day* signals; and these again both covered, when the line was clear, by another mask turning vertically on a pivot at the bottom, but secured in its upright position by a catch in connection with an electric wire extending to a battery at the nearest station. Furnished with this apparatus, the clerk or policeman on duty at the station might instantly, on the arrival of intelligence of any stoppage, cause the masks of the danger-signals along the line to drop simultaneously, in the manner in which the time-ball is dropped by the electric wire at the Greenwich Observatory. On the cessation of the obstruction, the masks might be returned to their places by the policeman or platelayers along the line. On a former occasion, the author suggested, in order to prevent accidents by collision, that there ought to be placed at each extremity of the train, a carriage or goods waggon, mounted at each end with a compression frame, containing from thirty to forty elliptic springs; or, at least, the locomotive engine should be fronted with such a powerful compression frame. 2. Some Notices of Attempts to Discover Perpetual Motion, by Daniel Wilson, LL.D., V.P. A curious collection of models, executed by various ingenious pursuers of the mechanical fallacy of perpetual motion, were exhibited, and Dr. Wilson gave some account of R. Aird, an indefatigable enthusiast, the constructor of several of the models. After pointing out the arguments by which the theory of perpetual motion was demonstrable as an impossibility, he remarked that there was one light in which the aim of such attempts might be viewed, which, though curious, he was not aware had yet been noticed. The attempts to endow dead matter with a self-originating and self-sustaining principle of motion was, in other words, an attempt to *create life*. If the theory of a perpetual motion in mechanics was possible, then its execution, or even the demonstration of its possibility, amounted to the most practical establishment of materialism that could be conceived; and the idea of a self-originating universe would no longer be open to dispute. 3. On Means which might be adopted in Public Buildings and Dwelling-houses for the Speedy Extinction of Fire, by James Stark, M.D., F.R.S.E., &c. The plan proposed was to have stop-cocks with screw mouth-pieces soldered to the supply-pipe of the upper cistern as it passed through each floor, and a hose of gutta percha tubing, with a coupling screw at one end and a brass nozzle at the other, kept ready to be fitted on when wanted.

## PROCEEDINGS OF INSTITUTIONS.

Basingstoke.—The Thirteenth Lecture Session of the Mechanics' Institution was closed on Tuesday fortnight, with a lecture on "The Vestiges of the Assyrian Empire," which was delivered at the Town-hall, by the Hon. and Rev. S. Best, rector of Abbotts Ann, and attracted a large audience, including several of the most distinguished families of the neighbourhood. The lecture was illustrated by a collection of diagrams, showing the costume, customs, barbarous cruelties, &c, which characterised the inhabitants of that great empire. In moving the cordial thanks of the meeting (which was unanimously adopted) to the Rev. S. Best, for his able lecture, the Rev. M. Harrison, V.P., offered some remarks upon the progress, and present prosperous position of the Institution, and recommended it as worthy of the support of the affluent, and of all who were desirous of promoting the comfort and intellectual advancement of youth.

Battersea.—In December last, a Literary and Scientific Institution was established in Battersea, which already numbers 227 members. The total receipts during the past quarter have been 128*l.* 13*s.* 5*d.* The expenditure has been 70*l.* 16*s.* 10*d.*, leaving a balance of 57*l.* 16*s.* 7*d.*, in the hands of the Treasurer. The number of volumes in the library now amounts to 1,100.

Battle.—On Monday evening a lecture was delivered to the members and friends of the Mechanics' Institution by the President, Horace Martin, Esq., "On the Saxon Conquest of England." The material of this lecture was chiefly taken from a recent French author, many of whose ideas, it was believed, were new and of an interesting character.

Carlisle.—The Annual Meeting of the Mechanics' Institute, was held on the Tuesday in last week, when the foundation-stone of the new Lecture-room was laid by the Mayor, by torch-light. Alex. Davidson, Esq., Vice-President, occupied the Chair. The Institution is in a very prosperous condition; during the last two years an addition of more than 50 per cent. has been made to the number of members, which was only 415 in 1851, and is now 634. This was considered to be due, in a great degree, to the establishment of a reading and news room; the classes had also partaken of the general prosperity. The library now contains 3,557 volumes, and the number of issues during the year amounted to 11,566, being an increase of 2,120 over the preceding year. After the reading of the Report, Dr. Elliot remarked, that he thought Carlisle stood well in comparison with other towns as to the number of its Institutions. "For instance," he said, "Newcastle-upon-Tyne, with a population of about four times that of Carlisle, had only the same number of literary institutions; and Manchester, with all its wealth and enterprise, had only sixty-two literary institutions, whereas it ought to have three times that number to have the same in proportion as Carlisle boasted of. But there was still much to do in Carlisle. Taking the adult population of the city, only one man in three was a member of a literary institution; consequently, they would either have to treble the number of their institutions, or the list of membership would have to be extended to three times its present length."

Halsted. Three lectures on the "Electric Telegraph" were recently delivered at the Mechanics' Literary and Scientific Institution by Mr. E. Wheeler, and were illustrated by diagrams and apparatus. In the first the lecturer gave an historical sketch of the science of telegraphing, the agency and first employment of electricity, and, passing on, adverted to the discoveries of Oersted, Ampére, Arago, Davy, and Faraday. He then came to the practical application of electricity as a mode of communication, and, laying aside all scientific technicalities, explained the system of communication most general in the present day, and showed the way in which the letters of the alphabet were expressed and transmitted from one railway station to another, and the various modes of insulating the wires. In the second lecture he treated at some length on the modes of averting the effects of lightning on telegraphic instruments and wires; on dial telegraphs, and the mode of communicating with intermediate stations; on signal bells and alarums; on the printing telegraph; and on the electro-scriptic or copying machine. In the third lecture the submarine telegraph was described, and Mr. Wheeler explained how it was possible to communicate across the water without wires, the waters of the ocean forming part of the communicating medium.

**Hastings.**—A lecture was delivered at the Mechanics' Institution, on Monday week, by the Rev. F. J. Sharr, on the "History of Philosophy in Germany." The chair was occupied by Mr. C. J. Womersley.

**Hertford.**—The Twenty-second Annual Report of the Literary and Scientific Institution states that the library now contains 4,420 volumes, and that the number of members is eighty-four. The Treasurer's accounts show a balance in favour of the Institution of 11*l.* 5*s.* 11*d.*, the year's income being 238*l.* 2*s.* 0½*d.*

**Leeds.**—The issues from the library of the Mechanics' Institution and Literary Society, from the 1st of January to 31st December, 1852, were:

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|---|---|
| 1654, | A. Theology. |
| 1698, | B. Philosophy; Education. |
| 477, | C. Politics; Statistics. |
| 7413, | D. History; Biography. |
| 4435, | E. Voyages; Travels. |
| 1987, | F. Poetry; Drama. |
| 14090, | G. Fiction. |
| 4268, | H. Fine Arts; Literature. |
| 146, | I. Mathematics. |
| 708, | K. Mechanics. |
| 736, | L. Chemistry. |
| 277, | M. Natural Philosophy. |
| 1055, | N. Natural History; Gardening. |
| 222, | O. Medicine; Dietetics. |
| 4040, | P. Bound Periodicals. |
| Total, 43206 | |
| 10325 | Unbound Periodicals. |

Total, 1852, 53531
Total, 1851, 53365

**Lymington.**—At the Annual Meeting of the Members of the Literary Institution, N. Adams, Esq., occupied the chair. From the report of the Committee, read by Mr. Sharp, the Secretary, it appears that there are 168 subscribers to the Society; that the library consists of 680 books, 117 having been added during the past year, 29 of which were presented, and 88 purchased. The receipts on behalf of the Society during the past year were 122*l.* 11*s.* 9*d.*, and the disbursements 113*l.* 14*s.* 11*d.*; leaving a disposable balance of 8*l.* 16*s.* 10*d.* The report stated that the financial position of the Institution was, in the opinion of the Committee, most satisfactory; as, among other things, they had been enabled to reduce the debt on the building. It then referred to an endeavour which is now being made to pay off this debt of 235*l.*, and touched upon the formation of the Discussion and Elocution Classes, and the efficient manner in which they had been conducted, and the hopes of the Committee that other classes would shortly be established. The report closed by a reference to the connection of the Institution with the Society of Arts, in London; and stated some of the advantages which might be expected to result from the union, though some time must necessarily be required to develope fully those advantages, and that an allowance must be made for the difficulties to be encountered in the outset, especially with respect to the plan of Lectures. The following officers were elected for the year ensuing:—President, Edward Hicks, Esq.; Vice-presidents, N. Adams, Esq., E. Chinery, Esq., Capt. Welch, and A. W. Beetham, Esq.; Treasurer, Mr. Chubb; Secretary, Mr. Sharp; Committee, the Rev. J. Martin, Messrs. Guy, Wright, Allen, Gibbs, T. Smith, and the Revs. D. Lloyd and J. Millard.

**Reading.**—The Twelfth Annual Meeting of the members of the Literary, Scientific, and Mechanics' Institution was held on Tuesday week;—the chair was occupied by Dr. Cowan. Mr. James Boorne, the Honorary Secretary, read the Report of the Directors, which stated that the reading-rooms, as in former years, had been well attended. The library had been much increased by the kindness of several friends, and by the union with the Society of Arts. There were twenty-two lectures, twelve of which were delivered gratuitously; and the attendance, both of members and non-members had exceeded the average of former years. The Treasurer's report was next read, from which it appeared that the Institution was entirely free from debt, and there was a balance in its favour of 25*l.* 3*s.* 10*d.*

**St. Michael's, Pimlico.**—On Monday evening, 2nd May, a lecture was delivered at the Literary, Scientific, and Mechanics' Institution by William Rushton, Esq., M.A., "On Plain English." The lecturer traced the history of the English language, and proved its Saxon origin by illustrations drawn from the provincial dialects, particularly those of the west and north of England. He then maintained that there was a mine of wealth in the Saxon part of the language, which might be profitably worked, especially in its application to elementary works of science. Science would never be popular in England, while the present system prevailed; the Germans taught the sciences in plain words, and what had been done in German might be done in English.

**Wednesbury.**—The Fifteenth Anniversary of the Mechanics' Institution, Library, and Reading-room, was recently held in the rooms of the Institution, for the purpose of receiving the report of the retiring Council, and the Treasurer's statement of accounts, and also of electing the officers for the ensuing year. The circulation of works from the Library during the past year amounted to 3,288, against 2,356 in the previous year. The number of annual subscribers was 24, and of quarterly subscribers 90,—being an increase of 21. From the Treasurer's statement of accounts, it appears that the Institution has now a small balance, whereas at the same period last year it was in debt 30*l.* 5*s.* 6*d.* At the election Mr. Samuel Lloyd was appointed Treasurer, and Messrs. Sampson Lloyd, and Samuel Lloyd, Jun., Secretaries.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the Journal regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

"*Rules and Bye-laws.*"—The Honorary Secretary of the Tunbridge Wells Useful Knowledge Institution will feel obliged by receiving copies of the rules and bye-laws of any of the Institutions in union.

## MISCELLANEA.

Industrial Instruction.—In the House of Commons, on Monday last, a copy was ordered, on the motion of Mr. W. Brown, M.P. for Liverpool, "of the Report on Industrial Instruction, and the evidence on which that Report is founded, presented by the Council of the Society of Arts to the Board of Trade."

Canadian Board of Agriculture.—A Board of Agriculture for Lower Canada was formed on the 28th of March; the first meeting being attended by the Governor-General, and Mr. Cameron, the Minister of Agriculture. The formation of thirty-six local County and Township Agricultural Societies was approved, and it was determined to hold an Agricultural Exhibition in or near the city of Montreal in the last week of next September.

Duties on Books and Engravings.—According to the amended scale of Customs' duties in the new Budget, the following charges are made:—Books, being of editions printed prior to 1801, bound or unbound, per cwt., 1*l.* 1*s.* Books, being of editions printed in or since 1801, per cwt., 1*l.* 10*s.* Books in foreign living languages, printed in or since 1801, bound or unbound, per cwt., 1*l.* 10*s.* Admitted under treaties of international copyright—viz., Works originally produced in the United Kingdom, and republished in the country of export, 15*s.* per cwt. Works not originally produced in the United Kingdom, 15*s.* per cwt. Prints and drawings, plain or coloured, separate, per lb., 3*d.* Prints and drawings, plain or coloured, bound or sewn, per lb., 3*d.* Admitted under treaties of international copyright, separate or bound, per lb., 1½*d.*—*Literary Gazette.*

Museum of Inventions.—The movement in favour of the establishment of a Museum of Inventions that has been commenced in many of the chief seats of manufacturing industry in this country is constantly extending itself, further memorials on the subject having just been addressed to the Government and the Royal Commissioners by Glasgow and Sheffield, signed in both cases by all the leading inhabitants of those towns. The Sheffield memorial was presented to his Royal Highness Prince Albert, the President of the Commission, on Thursday last, by the Mayor; and that from Glasgow, on Saturday, by the Lord Provost and a deputation. They express the opinion of the memorialists that such an institution has long been needed, and that it will command the zealous support of all who take an interest in the industrial development of this country. It is understood that the Commissioners of Patents, with whom the Board of Trade has entered into communication on the subject, are fully alive to its importance, and that Professor Woodcroft is, under their directions, making every exertion, and with great success, towards collecting such models of inventions and works having reference to them as may form a nucleus for the contemplated National Museum and Library of Inventions at Kensington. Temporary accommodation will be provided by the Patent Commissioners and by the Royal Commission until the question of the erection of an appropriate building for the due display of the collection is decided.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 28th April,* 1853.

227(1). Tavistock Election—Index to Minutes of Evidence.
243(1). Norwich Election Petitions Withdrawal—Ditto.
321. Athlone Election—Report from Committee.
353. Cirencester Election—Ditto.
403. Dockyard Regulations—Copy of Circular Order.
406. Consolidated Annuities (Ireland)—Return.
405. Bills—Aggravated Assaults (as amended in Committee, and on consideration of Bill as amended).
402. ,, —Copyholds (amended).
National Vaccine Establishment—Report.

*Delivered on 29th April.*

336. Leicester Election—Report from Committee.
352. Huddersfield Election—Ditto.
378. Burdens on Land (1846)—Appendix, Nos. 9, 10, 11, and 12, to Lords' Minutes of Evidence.

*Delivered on 30th April and 2nd May.*

191. Local Acts—Reports of the Admiralty.
354. Southampton Election—Report from the Committee.
357. Cockermouth Election—Ditto.
368. Ramsgate Harbour—Account.
376. Barnstaple Election—Report from the Committee.
386. Capital Convictions—Return.
400. Schools (Ireland)—Return.
409. Education—Copy of Minutes.
419. Committee of Selection—Eighth Report.
356. New Ross Election—Report from the Committee.
372. Mayo Election—Ditto.
382. Barnstaple Election—Minutes of Evidence.
387. Poor Relief (Ireland)—Summaries of Returns.
404. Bills—Whittlebury Forest.
411. ,, —Sales, &c., of Lands (Ireland).
417. ,, —Municipal Corporations Act Amendment.
418. ,, —Sales of Bullion.
423. ,, —Leasing Powers (Ireland), as amended by the Select Committee.

*Delivered on 3rd May.*

355. Taunton Election—Report from Committee.
366. Grand Jury Presentments (Ireland)—Abstract of Accounts.
410. Ceylon—Copy of Sir John Pakington's Despatch.
413. Terminable Annuities—Return.
424. Railway Accidents—Ditto.
425. Tynemouth Election—Report from Committee.
Turnpike Trusts—Reports of the Secretary of State.
Prisons—18th Report of the Inspectors, Part IV. (Scotland).

*Delivered on 4th May.*

191. Local Acts—Reports of the Admiralty.
268. Silver Coins, &c.—Copy of Correspondence.
379. Customs—Copy of Treasury Minutes, &c.
427. Committee of Selection—Ninth Report.
430. Trade and Navigation—Accounts.
Education, Minutes of the Committee of Council, Vols. I. and II.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 29th April,* 1853.

*Dated 24th Feb.*

468. C. Flude—Production of spirit and in stills.

*Dated 1st April.*

778. J. Smedley—Machinery for scutching.

*Dated 5th April.*

811. E. S. Stanley—Manufacture of soda from common salt. (A communication.)

*Dated 13th April.*

885. A. E. D. K. Archer—Apparatus for applying metallic capsules.
887. G. Elliott and W. Russell—Manufacture of alkali.
889. T. Edwards, steam-engines.
891. D. Hebson—Air-pumps of steam-engines.
893. W. R. Bowditch—Purifying water.
895. C. Clifford—Lowering ship's boats.

*Dated 14th April.*

896. J. Hinks and G. Wells—Improvements in certain boxes.
897. T. L. Preston—Cutting and piercing metals.
899. C. J. Duméry—Paste and enamel buttons.
900. C. Lowe—Corn-mills.
901. J. Chadwick—Raw and thrown silk.
902. J. Bethell—Flax.
903. W. Laycock—Metallic and other casks and vessels.
904. J. Adamson—Flushing apparatus and water-closets.
907. A. Guy—Filter.
908. C. Green and J. Newman—Wheels.
909. R. Wyburn—Easy chairs.
910. W. Ogden—Carding-engines.
911. W. J. T. Jones—Steam-engine governors.
912. D. Zenner—Treatment of ores, &c., and apparatus for same.
913. A. Crichton—Bilge pumps, injection cocks, and sailing vessels.
914. F. M. A. Serruys—Tanning. (A communication.)
915. J. B. Maniquet—Machinery for winding, cleaning, &c. silk, cotton, &c.
916. G. Titterton—Brushes.

*Dated 15th April.*

917. W. Wilkinson—Ropes, cords, &c.
918. W. Allen and W. Murrell—Cleansing bottles.
919. J. Lewthwaite—Rollers for blinds, maps, &c.
920. W. E. Newton—Treatment of refuse silk waste. (A communication.)

*Dated 16th April.*

921. P. Davis—Constructing breasting to drums of threshing-machines.
922. S. Bayliss—Consumption, smoke, and heating liquids.
924. J. M. Souchon—Manufacture of gas for illumination and apparatus.
925. J. Cooke and W. Cooke—Machinery for cutting corks.
926. J. A. Cator—Machinery for preparing flax, &c., for scutching, &c.
927. J. Simpson—Machinery for covering wire, silk, &c., with wire, &c.
928. H. Wilks—Cocks.

*Dated 18th April.*

930. J. Begbie—Wheeled carriages.

932. J. Watts—Pistons of steam and other engines.
936. J. S. Scarlett and W. S. Passmore—Mineral wicks to lamps.

*Dated 19th April.*

938. F. G. Sicardo—Rotary steam-engine.
942. J. Chatterton—Coating tubes.
944. J. Fuller—Galvanic batteries.
946. T. Day—Boots and shoes.
948. E. Vivian—Thermometers.

*Dated 20th April.*

950. J. Smethurst—Packing yarn, &c.
952. E. Chappuis, fils—Myriastratic reflector.
954. T. C. Foster—Reaping machine.
956. R. A. Brooman—Machinery for reaping and gathering.

*Dated 21st April.*

958. A. Deale—Ocean floats for saving lives and light treasures from shipwreck.
960. C. Reeves—Improvements in swords.
962. H. Carr—Construction of railways.
964. P. Harris—Fire-arms.
966—W. H. Johnson—Sewing cloth, leather, &c.

APPLICATIONS WITH COMPLETE SPECIFICATIONS FILED.

961. Juan Duran—Obtaining and applying motive-power. 21st April, 1853.
999. A. Slate—Improved filter for water and other liquids. 26th April, 1853.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 28th April*, 1853.

553. George Hattersley, of Sheffield—Invention of a radiating hearth plate.

*Sealed 30th April.*

577. John Crowther, of Huddersfield, and William Teale, of Wakefield—Improvements in obtaining motive power.
578. Edmund Adolphus Kirby, of Haverstock-hill—Invention of an improved adjusting couch for medical, surgical, and general purposes.
598. Henry Brock Billows, of Curtain-road—Improvements in the construction of gas-burners for illuminating and heating purposes.
608. Jerome André Drieu, of Manchester—Improvements in machinery for weaving and for dividing double cloth to make pile fabrics.
609. John Nicholas Marion, of Paris, and 4, South-street, Finsbury—Invention of a new mode of rendering concrete coleseed oil.
628. Alfred Sidebottom, of Downham-road, Islington—Improvements in machinery or apparatus for cutting books, paper, and other substances.
754. William Fraser Rae, of Edinburgh—Improvements in gas-heating and cooking apparatus.
814. Robert Heggie, of Kirkaldy, Fifeshire—Improvements in railway-breaks.
830. James Armitage, of Bury, and Charles Thaxter, of Fenton, Huntingdon—Improvements in dies for moulding plastic materials.
1106. John Clay, of Cottingham, East Riding, Yorkshire—Improvements in the manufacture of coal gas.
1113. Charles Pilkington, Thomas Pilkington, and Abraham Pedigar, of Sheffield, York—Invention of an improved joiner's brace.
48. George Stewart, of Enniskillen—Improvements in railways and in the propulsion of engines, carriages, and other vehicles thereon.
436. Pierre Auguste Tourniere, of 14, Kennington-terrace, Upper Kennington-lane—Improvements in propelling.
438. Samuel Rodgers Samuels and Robert Sands, of Nottingham—Improvements in looms for weaving.
451. Pierre Frederick Gougy, of Castle-street, and David Combe, of King-street—Improvements in apparatus for skidding or stopping wheels of carriages and other vehicles.
628. Thomas Hunt, of Leman-street, Goodman's-fields—Improvements in the construction of sights for firearms.

*Sealed 4th May.*

637. William Pope, of Holford-square, Pentonville—Improvements in the ventilation of ships.
639. Joseph Reynaud, of Paris—Invention of certain improved means of imitating marbles and various coloured woods.
641. Collison Hall, of Essex—Invention of an apparatus to be used in the carriage of solid and liquid bodies.
651. Hesketh Hughes and William Thomas Denham, of Cottage-place, City-road—Invention of certain machinery for the manufacture of fancy ribbons, ornamental trimmings, chenilles, fringes, and gimps.
652. James Hadden Young, of 66, College-street, Camden-town—Improvements in weaving.
709. George Lucas, of 42, Kennedy-street, Manchester—Invention of composition for filling engraved, cast, or sunk letters, devices, or ornaments, on or in brass, zinc, or other metallic plates.
725. Julien Francois Belleville, of Paris—Improvements in generating steam for producing motive-power or heat.
744. Gray Denison Edmeston, of Salford, and Thomas Edmeston, of Crow Oaks, Pilkington, Lancashire—Improvements in steam-engines, which improvements are also applicable to the regulating of water wheels or similar machinery.
765. Joseph Johnson, of Wellington Quay, Dublin—Invention of an improved mode of producing ornamental articles, such as brooches, bracelets, dressing and other cases, work or other boxes, or other articles, from a certain kind of wood.
795. Henry Bessemer, of Baxter-house, Old St. Pancras-road—Improvements in apparatus for concentrating cane juices, and other saccharine solutions, and in the treatment of such fluids.
796. Henry Bessemer, of Baxter-house, Old St. Pancras-road—Improvements in the crystallization and manufacture of sugar.
797. Henry Bessemer, of Baxter-house, Old St. Pancras-road—Improvements in the treatment of washed or cleansed sugar.
799. Henry Bessemer, of Baxter-house, Old St. Pancras-road—Improvements in apparatus for concentrating saccharine fluids.
1105. Charles Constant Boutigny, of Evreux, France—Improvements in distillation, and in the apparatus employed therein.
29. William Bendwell, of 4, Great Queen-street, Westminster—Improvements in treating sewage waters and matters.
341. Henry Pooley, of Liverpool—Improvements in weighing machines. (Partly a communication.)
359. Robert Ash, of 211, High-street, Southwark—Improvements in stopping bottles and other vessels.
363. William Potts, of Birmingham—Improvements in sepulchral and other commemorative monuments.
437. Wright Jones, of Pendleton, Lancashire—Improvements applicable to steam-pipes used for warming, drying, or ventilating.
483. Frederick Goodell, of Half-moon-street, Piccadilly—Invention of an improved apparatus for the distillation of rosin oil, and for an improved method of bleaching and deodorising the same during the process of manufacture. (Partly a communication.)
491. Lord Berriedale, of 17, Hill-street—Improvements in weaving.
525. Robert Waddell, of Liverpool—Improvements in steam engines.
555. John Gedge, of 4, Wellington-street, Strand—Improvements in the construction of fire-arms, and in the means of loading the same. (A communication.)
562. Richard Barter, of St. Ann's-hill, Blarney, Cork—Improvements in cutting roots and other vegetable substances.
592. James Kimberley, of Birmingham—Invention of a new or improved gas-stove.
598. James Hogg, jun., of Nicholson-street, Edinburgh—Improvements in making machinery or apparatus for cutting paper and other substances.
597. Joseph Shuttleworth, of Stamp-end Iron-works, Lincoln—Improvements in appendages to portable machines for threshing, shaking, and winnowing corn.
601. George Collier, of Halifax, Yorkshire—Improvements in the manufacture of carpets and other fabrics.
605. George Collier and Samuel Thornton, of Halifax, Yorkshire—Improvements in spinning, roving, doubling, and twisting cotton, worsted, flax, and other fibrous materials.
607. James Walmsley, of Scout Newchurch, near Manchester—Invention of improved machinery and arrangements for block printing.
611. George Collier, of Halifax, Yorkshire—Improvements in machinery or apparatus used in weaving.
619. Moses Poole, of Avenue-road, Regent's-park—Improvements in apparatus for serving oysters and other shell-fish. (A communication.)
627. George Michiels, of Holywell-street, Westminster—Improvements in obtaining oxygen for manufacturing purposes.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| April 29 | 3455 | Improved Self-acting Fastener for Casements, Doors, &c. | W. Wilkes Woodhill | Eagle Brass Foundry, Birmingham. |
| ,, 30 | 3456 | Metallic Pen | Isaac Smith | Birmingham. |

# SOCIETY OF ARTS.

**FRIDAY, MAY 13th, 1853.**

## TWENTIETH ORDINARY MEETING,

*Wednesday, May* 11*th*, .1853.

The Twentieth Ordinary Meeting of the Society was held on Wednesday, the 11th instant, Henry Cole, Esq., C.B., in the chair.

The following were elected Members:

Elliott, Rev. William, Harewood-street, Dorset-square.
Johnson, John Henry, 47, Lincoln's-inn-fields.
Joynt, William Lane, Limerick.
Wilson, Alderman Richard, Bramley, near Leeds.

A paper was read on the "Application of the Microscope to Photography," by the Rev. W. Towler Kingsley. The author commenced by a brief account of the laws of refraction, the nature of the prismatic spectrum, and the separation of a ray of light into the heating, light-giving, and chemical rays; he then said—

I shall now proceed to state what is the nature of the change produced by the action of light on silver salts. We may easily conceive that the molecules of the simple substances of which a compound body is formed are capable of different periods of vibration, like two strings of different note; and hence, if the vibrations of the luminiferous ether are taken up by one substance and not by the other, and the chemical affinity of the one for the other is at the same time feeble, chemical decomposition would ensue. This, at any rate, seems to be a reasonable view of the case. The salts of silver are very easily decomposed, and there is always a tendency in them to allow the silver to return to the metallic state. For instance, the oxide of silver is reduced to the metal by heat with great ease, or by placing it in contact with any substance that has a considerable affinity for oxygen. This action, however, is much more rapid if the process be carried on in strong sunshine. The iodide of silver follows the same law; but bromine and chlorine have a greater affinity for silver than iodine; and if we expose iodide of silver to the action of bromine or chlorine, or of both in order, we shall disturb the feeble affinity of the iodine for the silver, and render the compound so unstable that the action of light is quite able to reduce the metal; and if we stop short before we reach this point, it is still possible to carry on the further reduction of the metal by the use of substances which have a slightly greater affinity for the iodine than the silver has in its now altered condition. This process constitutes the whole practice of photography; for though other metals than silver can be used for the purpose, it is the cheapest as yet known that possesses the property of returning to its simple form with sufficient ease for the purpose.

The process of Daguerre, as now practised, is to expose a polished and clean silver plate to the action of the vapour of iodine, and then, for a very short time, to that of bromine, and then a second time to that of iodine. This treatment coats the plate with iodide of silver, and then liberates a portion of the iodine, bromine taking its place. The image of the object to be delineated is now formed upon the plate, and then the plate is exposed in the dark to the action of the fumes of mercury, which in a short time whiten the parts that the light has acted on. It used to be thought that the image was formed by particles of mercury being deposited upon the surface of the silver. This, however, I am sure, is quite a mistake; and though I am unable to explain the whole action that takes place, I have no doubt of the nature of it. The vapour of mercury has a decided affinity for oxygen, iodine, bromine, and chlorine; when, therefore, the plate is exposed to it, the vapour deprives the iodide of silver of its iodine, and deposits pure silver. When bromine and chlorine are also present, silver is reduced, and at the same time salts of mercury are formed; and I have no doubt that the different colours of the lights, according to the different proportions of iodine, bromine, &c., are due to these salts of mercury; but as the quantity is very minute, it is a matter of great difficulty to detect them,—calomel and the black oxide I have detected. After the plate has been acted upon by the mercury, it is fixed by first removing the unreduced iodide by a bath of hypo-sulphite of soda, and then by gilding it slightly with hypo-sulphite of gold. If the action of the light be too strong, metallic silver is formed at once, and then the mercury unites with it, and forms an amalgam that is not as light in colour as the silver reduced in the first instance. This seems to be one of the points where there is hope of gaining by further experiments; for if some way of reviving the silver on those parts of the plate where the light has not actually reduced the silver can be discovered, without destroying the revived parts, we should be able to make sure of every plate by merely giving time enough to the exposure to the light. I may mention that the vapour of aldehyde gives promise of effecting this object. As a deoxidizing or deiodizing agent, it is most powerful, but the difficulty is to restrain its action. For the microscope, Daguerreotype plates prepared in the usual manner are quite capable of receiving an impression in about a minute's exposure. These impressions, however beautiful, will never be as useful as those taken on glass or paper, and which admit of being copied photographically.

The most simple process is that known under the name of the Collodion Process, introduced by Mr. Scott Archer.

It is not worth while to describe the method of making collodion, as it can be bought ready-made as cheap as it can be made. With it a very small quantity of iodide of silver, dissolved in iodide of potassium or in cyanide of potassium, is mixed. This is now to be poured on a plate of glass, and the excess poured off again, so as to leave a film of the preparation on the glass surface. The plate is now to be plunged into a bath of nitrate of silver, 30 grains to the ounce of water; and as soon as the whole of the plate will retain the water without running into streaks, the plate is to be exposed to the action of the light; then it is to be plunged into a bath of pyrogallic acid, 3 grains; water, 1 ounce; glacial acetic acid, 1 drachm. This deiodizing and deoxidizing bath developes the image; the unreduced iodide is then to be removed by hyposulphite of soda. This is the ordinary process, and the method is simple and good. If we add to the collodion mixture a small quantity of iodide or bromide of iron, and develope with protonitrate of iron, the process is rendered much more energetic; for we obtain on the plate, as soon as it goes into the silver bath, nitrate of iron, which deiodizes the plate as soon as the light strikes it. I do not find these preparations of iron to keep well, and therefore the preparation should be made only a short time before it is to be used. Iodide and bromide of arsenic are also admirable accelerators, and appear to keep for months without change; with them either the pyrogallic solution or protonitrate of iron may be used. I do not think that the collodion process will be as good as the paper processes, because it is a very difficult matter to coat large glass plates; and after they are finished, they take up a great deal of space; also, they are more troublesome to take positives from.

I may here mention that albumen, treated exactly the same as the collodion, only dried and heated after being poured on the glass, acts just as well and as quickly.

I shall now describe the method of preparing the paper I use. I have no doubt that many others are just as good.

I prefer Canson's paper, and use it either waxed or not, with nearly the same results; but the waxed paper is the more easily managed, on account of its not becoming so tender from soaking. The paper is first to be soaked for some hours in a bath composed as below:

Distilled water, 1 pint;
Iodide of potassium, half-an-ounce;
Bromide of potassium, half-a-drachm;
Fluoride of potassium, 1 drachm;
The whites of two eggs.

If this is done under the air-pump so much the better. The paper is now to be hung up to dry, sheet by sheet; and so prepared, it keeps well, certainly for months. If arsenic be added, as in the collodion, the paper is more sensitive. When it is to be used, it is to be plunged into a bath composed as follows:

Nitrate of silver, 30 grains;
Acetic acid, half-a-drachm;
Distilled water, 1 ounce.

After the paper has become saturated in this bath, it is to be placed on a sheet of pure blotting-paper, and that on a sheet of glass on which it will adhere from the superabundant fluid; it is now to be exposed to the action of the light for the required time, which of course depends upon the intensity of the light; with my microscope, from two to five minutes is quite enough. It is then to be developed in a bath of saturated gallic acid; if the image does not seem dark enough in an hour, a few drops of the silver bath should be added. Hyposulphite of soda as usual is the fixing agent. The silver may be used over and over again, if it be filtered with animal charcoal after each time it is used, or as soon as it shows the least sign of becoming discoloured.

In these processes we have the affinity for the iodine disturbed by the action of the light; the developing agent carries this further, and the oxygen of the air or water or acid, which has always a slightly greater affinity than iodine for silver, combines with the liberated silver and produces the dark parts of the impression; if the action is carried still further we get the silver revived: and in the collodion process this produces a positive. To obtain these collodion positives, the quantity of silver in the collodion should be small, and the exposure only for an instant; after the plate is developed and fixed it should be put into a bath containing either aldehyde or grape sugar, which will revive the silver with great brilliancy. The paper pictures may be developed by placing them in the mercury box, but it is not a good way of doing it. There is one use of the collodion which is of service. In the use of very high powers with very delicate objects it is not easy to see the image formed on the vesculine screen as described hereafter. When therefore an approximate focal distance has been obtained, a collodion positive on a small scale of a portion of the image can be taken in a few moments, and so the correctness of the arrangements tried before placing the paper in its place.

I shall now proceed to describe the instrument I use. Sunlight is of course far superior to any artificial light, when we can obtain it; but as the sun will not shine whenever we choose, it is of the greatest importance to construct the instrument for artificial light, and then modify it so as to be applicable to sunlight. The light I use is the common oxyhydrogen light; magnesia or quartz may be substituted for lime ball with advantage.

The optical parts of the instrument divide themselves into four groups. The light collecting, the condensing, the objective and magnifying lenses. The first group for collecting the light consists of three lenses; the first a meniscus of about three inches focal length and two and a half diameter, the second plano-convex, and the third a double convex with the radii of the surfaces one and six. The focal lengths of these two lenses being respectively six and eight inches.

The second group, or condensing lenses, is a similar one turned the other way and on reduced scales to suit the different object glasses; between these two systems there is a plano-convex placed at its focal length from the focus of the collectors, so as to allow the rays to pass parallel to the condenser. This lens and the condensers must be changed with the object-glasses; for it must be borne in mind that we have to arrange the instrument so as to make the image of the lime ball just cover the paper to be acted upon; and so if we diminish the focal lengths of the condensers at the same time that we increase the magnifying power of the instrument, we shall have just as great an amount of light with the highest as with the lowest powers.

The next group of lenses are those of the object-glass, which requires to be very much under corrected for visible colour, leaving strong red fringes. A very simple way of making the object-glasses of an ordinary good microscope do for photographic purposes is to have a new front lens made for them; so that they can be used for either the ordinary or the photographic microscope. At this point of the arrangement we have a very good form of the oxy-hydrogen microscope; but it is a bad one for photography, as we cannot have the screen on which the image is to be formed, so near, as to enable us to use the slow motions of the various arrangements at the time we are looking at the image, except for very low powers.

We now come to the last group which occupies the place of the eye-piece of the ordinary compound microscope. This group is a form of the Ramsden or positive eye-piece, which ordinarily consists of two plano-convex lenses, placed at two-thirds their focal length, which is the same in both, and with their plane sides out. This eye-piece is not achromatic, being under corrected. The addition of a plano-concave flint lens to a double convex crown, is used by me in the place of the lens next the object. This enables me, by a slight change of distance, to make the correction perfect.

I have now only to describe the best way of using this instrument; and here, it must be remembered, that all depends upon the object-glass being good; it is very easy to get one of small angle that will give very short outlines of objects, but we must not be content with such images as these; we must get object-glasses of large angular aperture, made perfect for this purpose, so as to show well the structure of objects, as well as their outlines. This is quite feasible. Suppose, then, that we have got a perfect instrument.

At the place of the focus of the object-glass place a screen of æsculine, and a dark blue glass between the collectors and condensers; we shall now, "thanks to Professor Stokes," see the chemical image; and the correction for spherical aberration must now be made in the ordinary manner. Now put in the eye-glass or magnifier, and the æsculine at the screen, and adjust the focus. This focus will be found even in the case of chemically corrected lenses, beyond the visible; but in the case of the ordinary best object-glasses, the difference is enormous; for instance, in the case of a very fine one-fifth in my possession, if I form an image at one-foot from the eye-glass, I find the chemical image ten feet further back; of course such a lens is of *no* use for photography.

The æsculine also enables one to see at once when the light on the screen is the most intense for chemical action.

In conclusion, I have to state that one of the specimens sent was taken upon a disc of five feet diameter, which was illuminated equally, and therefore anything may be taken on that scale on paper with artificial light, and I dare say on a very much larger scale still. I look upon it, therefore, that we must give our chief attention to the corrections of the lenses, as all the other parts of the process seem to require little further than mere care in the use of common formula. I have also to add, that the focal length of the condenser being selected, in order to give the image of the incandescent spot of lime on the right scale, its angular aperture should be a shade less than that of the object-glass.

Also, if a spot of tin-foil be placed on the condenser, we can get the object bright on a dark ground; and if an opaque object be placed in the focus of the collecting lenses, and the object-glass and eye-piece be turned round to the front of the object, a very good image may be got with low power.

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Mr. FOSTER, as an amateur in photography, wished to express his high sense of the importance of Mr. Kingsley's experiments, especially with regard to lenses, in respect to which they were far from having arrived at perfection. The data, however, furnished by Mr. Kingsley's experiments would, he trusted, lead to results more satisfactory than had hitherto been gained.

A GENTLEMAN, referring to some of the experiments Mr. Kingsley had just shown, asked if there were anything peculiar in his mode of bringing out the Daguerrean image?

Mr. KINGSLEY said he had merely performed the experiment in question for the purpose of showing that the development of the image on a Daguerreotype plate did not depend, as some supposed, on the precipitation of mercury on its face. The agent he had used for that purpose was merely a solution of common pyro-gallic acid.

The CHAIRMAN said, that as by means of the microscope beauties were discovered which were not seen before, he wished to ask Mr. Bowerbank to what extent these magnified images might be again magnified, and what advantages might be obtained by the process?

Mr. BOWERBANK said, no good was to be gained by magnifying any object beyond the point of obtaining a good definition. Referring to one of the specimens exhibited, he remarked that it was even too large to be of service for the purposes of physiological science; whereas, had it been taken by a low-power glass, with considerable penetration, instead of by a high-power glass with a large angle of aperture, he thought Mr. Kingsley would agree with him that it would have been better. With the greater number of microscopic objects, increase of size was not so much to be desired as extreme penetration. He was glad to see the progress which Mr. Kingsley and some other gentlemen were making in this department of the photographic art. In the last number of the *Microscopic Journal*, he understood there were one or two figures given, showing not only the possibility but the probability that periodicals would be illustrated in this manner, and thus much greater accuracy obtained than could be arrived at by means of the pencil. He hoped the time was coming, when photographic pictures in journals would be as common as those by the *camera lucida*.

Mr. VARLEY confirmed the observations of Mr. Bowerbank.

Mr. SAMUEL HIGHLEY, Jun., said, that the value of the application of photography to the microscope could not as yet be sufficiently estimated; but undoubtedly it would perform a very important part in the advance of the science of microscopy, for not only were we enabled to multiply and distribute delineations of scarce objects, and thereby elicit the opinions of other observers, but in many instances where there was diversity of opinion and contradictory statements regarding minute structure, it would aid others in forming an opinion as to what had really been seen; as a faithful representation of what existed in the field of the microscope was insured to us, entirely free from the suspicion of having been delineated by a hand biassed by pre-conceived ideas. With the permission of the meeting he would read a letter which he had that day received from Mr. Fox Talbot, as it conveyed information as to the first employment of sensitive media for securing delineations of magnified objects.

Lacock Abbey, May 10th, 1853.

Dear Sir,—I have great pleasure in replying to your question. The first person who applied photography to the solar microscope was undoubtedly Mr. Wedgwood, as appears by his paper in the journal of the Royal Institution for 1802; but none of his delineations have been preserved, and I believe that no particulars are known. Next in order of time to Mr. Wedgwood's, came my own experiments. Having published my first photographic process in January, 1839, I immediately applied it to the solar microscope, and in the course of that year made a great many microscopic photographs, which I gave away to Sir John Herschell, Sir Walter Calverley Trevelyan, and other friends. The size of these pictures was generally that of a half sheet of writing paper, or about eight inches square. The process employed was my original process, termed by me at first "Photogenic drawing,"—for the calotype process was not yet invented. I succeeded in my attempts, chiefly in consequence of a careful arrangement of the solar microscope, by which I was enabled to obtain a very luminous image, and to maintain it steadily on the paper during five or ten minutes, the time requisite. From the negative, positives were made freely, in the usual way. The magnifying power obtained was determined by direct measurement of the image and the object itself, which gave for result a magnifying power of seventeen times in linear dimensions, and consequently of 289 in surface. The definition of the image was good. After the invention of the calotype process, it became of course a comparatively easy matter to obtain these images; and I then ceased to occupy myself with this branch of photography, in order to direct my whole attention to the improvement of the views taken with the camera.

I remain, dear Sir, yours very truly,

H. F. Talbot.

Mr. Samuel Highley, jun.

In a letter to the Editor of the *Athenæum*, which appeared in that Journal last summer, Mr. Dallas again drew attention to the application of photography to the microscope, and stated that he had obtained very favourable results; but he did not give the details of the means employed. In the autumn of last year, whilst in Edinburgh, he (Mr. Highley) had an opportunity of seeing some of these views, but they were wanting in definition. In October, 1852, Mr. J. Delves introduced to the notice of the Microscopical Society, some very beautiful Collodion positive and negative pictures, in which the definition was extremely sharp. This Mr. Delves attained by removing the eye-piece of the microscope, and inserting that end of the body into a dark chamber or camera, twenty-four inches in length; beyond this point the image was not sufficiently defined; the object was placed on the stage, the direct rays of the sun received on the mirror, and reflected in the direction of the axis of the microscope; the object was then focussed on the ground glass of the camera, the sensitive collodionised plate replaced the focussing glass, and an image was obtained in from ten to sixty seconds. As the chemical and visual foci did not coincide in microscopic object-glasses, in consequence of their being *over-corrected*, allowance for this was necessary, and was effected by bringing the lens nearer to the plate by aid of the fine adjustment. The amount of correction varied with every object-glass, and must be ascertained by direct experiments; but whilst the lower powers required a considerable amount of correction, the higher needed but a slight, if any alteration. Mr. Highley then introduced to the notice of the Society a microscopic camera, founded on the arrangement of Mr. Delves, but presenting the advantages of compactness, and being always arranged for immediate use; whilst to those photographers who were not already possessed of a microscope, it would be found an economical arrangement. It consisted of a tube which screwed into the flange of a photographic lens, and carried the object-glasses. Over this fitted another tube, and by the sliding movement formed the coarse adjustment. This outer tube carried the stage and its fine adjustment on its upper side. To its under surface was attached a smaller tube, to which the mirror fitted, and which likewise carried the fittings for the polarizing prisms. Behind the object-glass was a fitting for the analyser. Mr. Highley was of opinion that in many instances where the object was of a nature that depolarized light, advantage might be taken of this property to bring them up to *actinic* tints by the employment of polarized light and Darker's Selenite Stage; for whilst by this means the object would be of a colour that would produce the greatest amount of chemical effect, the plates of selenite being *minus* the thickness and refracting power of the object, would produce a background several tints less intense in colour and in actinic action. He referred to a diagram representing the various colours exhibited by a plate of selenite of varying thickness when viewed by polarized light, and likewise to the object itself in a polaroscope; also to another diagram representing crystals brought up to a deep blue by aid of selenite plates, the ground being of a greenish tint; and to the objects themselves arranged under polarizing microscopes. By such an application we should likewise probably be enabled to obtain representations of the internal structure and directions of tension in crystalline bodies. In reference to the asserted necessity for complete steadiness, Mr. Highley stated that Mr. Shadbolt had taken a great many views by the camphine light, in London, without any special arrangement for securing greater steadiness than was usually obtained in houses in London.

Mr. Kingsley said that this was done with low powers; whereas the specimens which he had exhibited were taken with higher powers. He wished to show that the very highest powers of the microscope might be used, and that the light could be obtained for the highest magnifying powers they had. He had taken one as high as fifty thousand diameters; the time required being about ten minutes.

Mr. Bowerbank handed to the Chairman a photograph of a *Navicula angulata*, taken by Mr. Delves with a one-twelfth object glass.

The Chairman proposed a vote of thanks to the Rev. Mr. Kingsley, which was carried unanimously.

It was announced that at the next meeting, on May 18th, a paper would be read, by A. G. Findlay, Esq., F.R.G.S., "On the Proposed Central American Canal, and its Relations to Commerce."

## HOW TO OBTAIN PATENTS FOR INVENTIONS.

In the last Number of the *Mining Journal*, Mr. F. W. Campin gives the following statement of the course of proceeding required by the law in order to patent an invention, premising that this Act is not all that could be wished, and that it does not embrace a new patent code—that is, it does not contain the whole of the Patent Law, and therefore the ancient laws must still be referred to by those who wish to have a comprehensive view of the matter.

1. *The Application.*—This is required, by the sixth section of the Act, to be made by filing, at the office of the Commissioners of Patents, a petition, a declaration (attested by a Master in Chancery or Justice of the

Peace), and a provisional specification. The two first of these are forms of a particular size, &c., already in public circulation, which require merely to be filled in with the name and address of the intending patentee, and the *title* of the invention. The construction of a proper title, however, is a matter of much importance, since the object of the invention must be truly, though it may be concisely, indicated by it; and a bad title has overthrown numbers of patents in courts of law; and incomprehensive titles have frequently obliged patentees to take out several patents where one should have sufficed. The *provisional specification*, however, is the substantial document, as the Act expressly requires that it shall describe "the *nature* of the invention"—that is, it must set forth what the invention really does consist in, not of necessity by a detailed account of parts, proportions, &c., with drawings, if requisite, as in the complete specification, but only such a description as shall set out the *distinctive character* of the invention; and by sections 7 and 8, this must be done in such a manner as to satisfy the law-officer to whom the application is to be referred; although the approval of the law-officer will not make this document good if it should not be found to comply, in all respects, with the terms of the Act; and should this document be couched in very restrictive terms, the patentee may find himself shut out from including in his patent, by his complete specification, those practical improvements in details, which may be of vital importance to the success of the invention. These documents having been prepared, the petition (if not already stamped) must be stamped with a proper *five pounds stamp*, and presented at the Commissioner's office, where the day of its delivery will be recorded, and priority secured from that day, unless it be otherwise specially ordered by the proper officers.

By section 9, the applicant may deposit his complete specification instead of the provisional specification; but as this at once concludes him, as to practical details and everything else, and requires the payment of the *five pounds* stamp duty on that document, as well as the five pounds on the petition, it is seldom adopted.

The application having been filed and passed by the law-officer, is then advertised in the *London Gazette*, as protected for six months, during which time the invention may be *used* and *published* without invalidating the patent.

2. *Proceeding to Complete the Patent.*—After the application is passed, the patentee may proceed as quickly as he pleases to complete his patent, which is done by the agent giving *notice* to *proceed* at the Commissioner's, and upon payment of *five pounds*. This notice is then gazetted, and any one is invited to oppose within twenty-one days from the date of the *Gazette*. This stage *must* be taken at four months from the date of the application, otherwise the obtaining of the patent within the six months' protection (which is required by the Act) will be attended with great risk of losing the patent.

When this has been gone through without opposition, the patentee may apply for his warrant, which is done by paying *five pounds*, and then to seal and complete the patent by paying another *five pounds*. This must be done some days within the term of three months from the date of the warrant (*vide* section 19).

3. *The Specification* (otherwise, *The Complete Specification*).—The patent so obtained will be found to contain (unless a complete specification has been deposited on application) a proviso, obliging the patentee to file in the Commissioner's office an instrument in writing, which shall particularly describe and ascertain the nature of his said invention, and in what manner the same is to be performed, to be filed within six calendar months next and immediately after the date of the letters patent, and the date of the patent (unless in an extraordinary case) will be found the same as the day of the *application;* so that, if the completing of the patent be put off till the last moment, the specification will have to be prepared at the same time therewith.

The specification is no new document, and its importance to the inventor, as a document setting forth his claim in regard to the patented invention, and to the public as the record teaching them the improved art invented by the patentee, is pretty well understood. Nevertheless, it is never out of place to remind patentees that the law strictly requires of this document, that it shall define with legal certainty and exactitude nothing more or less than a new and useful invention, and the very best way of carrying out the same, in all its details (with drawings, if necessary), as known to the patentee. It must also be consistent with the provisional specification; in reality, it should be simply a further development of that document. Indeed, skill and experience in preparing these documents are eminently necessary to render them reliable. The specification and drawings must be on parchment of a peculiar size, &c., and stamped with a proper *5l.* stamp.

The stamp duties mentioned are required to be paid by the Act just passed, levying the Government patent dues by stamps.

To keep a patent in force, further stamp duties, of 50*l.* at the third year, and 100*l.* at the seventh year must be paid. There are other points of importance in the new law, but they do not refer to the ordinary routine of passing letters patent.

## SELF-SUPPORTING ELEMENTARY SCHOOLS OF ART.

The following communication has been received from the Dean of Hereford, and will be found useful as illustrating the working of the new system. It should be borne in mind that in this instance the premises are rent free.

Deanery, Hereford, 19th April, 1853.

MY DEAR SIR,—Our elementary drawing-school, in connection with the Board of Practical Art at Marlborough House, has now been open for more than two months, and promises so well that I think I ought to give you some account of it.

The room, a very large and fit one, where the classes meet, has been admirably fitted up for the purpose, under the direction of the Master and the Committee, at an expense of between 30*l.* and 40*l.*, which, with the models and examples we have had from your Board at half price, amounts to nearly 70*l.* Of this sum rather more than 40*l.* has been raised by subscription, the rest paid out of the class fees.

There are two classes, one a day class, consisting of the upper classes, in the town and neighbourhood, meeting twice a week in the morning, for a lesson of two hours. In this class there are 48 pupils, paying 2*s.* per week.

The other a night class, consisting of the mechanics and artisans of the place, meeting twice a week in the evenings also for two hours each. In this class there are 51 pupils, paying 6*d.* per week.

There are also four schools in which the master attends to give instruction once a week; three of them being schools for the poor, pay 5*l.* per annum. One, the Cathedral School, paying 10*l.* per annum to the master, who receives the whole of what the schools pay, but only one-half of what is paid by the classes, the other half being paid to the Committee to meet the current expenses.

Our accounts have just been balanced for the last two months. The amount of payments by the classes for that time is 47*l.* 6*s.*, one half of which, 23*l.* 13*s.* has been paid to the master. This, supposing the payments to continue on an average what they have been—and there is every probability that they will do so—would give from this source, supposing the school to be at work forty-four weeks in the year, a salary of 129*l.* 15*s.* 6*d.*, to which add the schools, and this will make the master's salary 154*l.* 15*s.* 6*d.*

I have very often visited the classes while at work, and have been very much struck with the great interest which they all seem to take in it. The evening class of artizans and mechanics I have been particularly struck with, and I do not know when I have seen a more interesting sight than this class earnestly at work, with their room well-lighted up, every one apparently bent on deriving all the benefit he can from the instruction given.

These schools promise to be a real blessing to the town, not only from the useful instruction they are giving, but also from the opportunity which it affords to those who attend the evening classes of spending their evenings in the way many of them are now doing, and so different from what has hitherto been the case.

The instruction is popular with all classes, and I have no doubt, now we are started, it will be in every way self-supporting.

Had your Board made us an offer of 200*l.* per annum, (which is about the sum it will take to carry on these schools well), on condition that instruction should be gratis, I believe it would have been a complete failure. I cannot but look upon this experiment as a happy illustration of the self-supporting principle, which ought, more or less, to characterise all education.

The population of Hereford is under 13,000, the trades in it entirely those connected with agriculture—we have no manufactures whatever—this makes the success of these schools the more striking. One does not wonder at success in such a town as the neighbouring one of Worcester, with the large porcelain manufactures; at all events, this, I think, will be a safe conclusion for you to draw, that when the population of a town is sufficiently large to require a school of this kind, that the instruction they offer is so useful, and so much in request, that when well directed, they may at once become self-supporting; and that they ought not to look to the Board of Practical Art for help, beyond that of having models and examples at the prices you are now allowing us to have them.

We have an admirable Honorary Secretary, who tells me he has no doubt whatever of the continued prosperity of these schools. The Mayor of Hereford is Chairman of our Committee of Management, and takes great interest in it.

Believe me, my dear Sir, very sincerely yours,
(Signed) RICHARD DAWES.

Henry Cole, Esq.,
Department of Practical Art,
Marlborough House.

An intermediate evening class, paying 1*s.* per week, is contemplated on the alternate evening with the other.

### SELF-SUPPORTING ELEMENTARY DRAWING AND MODELLING SCHOOLS, AT HEREFORD.

TREASURER'S ACCOUNT at April 12th, 1853.

| *Dr.* | £ | *s.* | *d.* | £ | *s.* | *d.* |
|---|---|---|---|---|---|---|
| Subscriptions in aid of outfit, received up to present time | | | | 43 | 11 | 0 |
| 1st Month:— | £ | *s.* | *d.* | | | |
| Forty-eight pupils at 2*s.* per week, 4 weeks | 19 | 4 | 0 | | | |
| Fifty-one pupils at 6*d.* per week, 4 weeks | 5 | 2 | 0 | | | |
| 2nd Month:— | | | | | | |
| *Forty-six pupils at 2*s.* per week, 4 weeks | 18 | 8 | 0 | | | |
| Forty-six pupils at 6*d.* per week, 4 weeks | 4 | 12 | 0 | | | |
| | | | | 47 | 6 | 0 |
| | | | | 90 | 17 | 0 |
| Subscriptions promised (not yet paid) | | | | 5 | 8 | 6 |
| | | | | 96 | 5 | 6 |

| *Cr.* | £ | *s.* | *d.* |
|---|---|---|---|
| Payments made for the School by the Very Rev. the Dean of Hereford, including carriage, &c., of casts and examples | 34 | 7 | 6 |
| Advertising, printing, &c. | 6 | 3 | 5 |
| Boards for College School (to be repaid) | 2 | 8 | 0 |
| Use of Guildhall for Preliminary Meetings | 0 | 10 | 6 |
| Williams, carpenter, alterations to room-desks, fittings, &c. | 17 | 11 | 0 |
| Watkins, for colouring and painting room | 6 | 10 | 0 |
| Postages, and sundry small expenses | 2 | 2 | 6 |
| Candles for lighting room, evening classes | 1 | 12 | 11 |
| Cleaning room and attendance | 1 | 0 | 0 |
| | 72 | 5 | 10 |
| Mr. Clifton, master, half-fees from scholars | 23 | 13 | 0 |
| | 95 | 18 | 10 |
| Balance | 0 | 6 | 8 |
| | 96 | 5 | 6 |

There will be due, at Midsummer, a moiety of fees from the public schools, the whole of which goes to the master—namely:

| | £ | *s.* | *d.* | £ | *s.* | *d.* | £ | *s.* | *d.* |
|---|---|---|---|---|---|---|---|---|---|
| Cathedral School | 10 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| Scudamore School | 5 | 0 | 0 | 2 | 10 | 0 | 2 | 10 | 0 |
| Blue-coat School | 5 | 0 | 0 | 2 | 10 | 0 | 2 | 10 | 0 |
| St. Peter's (or Mr. Venn's) | 5 | 0 | 0 | 2 | 10 | 0 | 2 | 10 | 0 |
| | | | | 12 | 10 | 0 | 12 | 10 | 0 |

J. T. OWEN FOWLER,
Hon. Sec. and Treasurer.

* Of Class A, two pupils in arrear, deduct therefore 16*s.* from 47*l.* 6*s.*, leaves 46*l.* 10*s.*, half of which—namely, 23*l.* 5*s.*, paid to Mr. Clifton, the remainder will be paid at next quarter.

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## PUBLIC LIBRARIES AND MUSEUMS.

AN important return has recently been presented to the House of Commons, and printed by their order, showing the results which have been produced by Mr. Ewart's "Library and Museums Act" (8 and 9 Vict., c. 43). The return is incomplete, inasmuch as several important replies had not been received; but it is nevertheless a very interesting and valuable document. The kind of information which Mr. Ewart desired to obtain is best shown in the title of the return itself, which is as follows:

"Returns showing in what Boroughs in England and Wales Libraries and Museums have been formed, under the Act (8 and 9 Vict. c. 43), 'For encouraging the Establishment of Museums in large Towns,' and under the Act (13 & 14 Vict. c. 65), 'For enabling Town Councils to establish Public Libraries and Museums;' with the Date of their Establishment; the sum subscribed (if any) to promote such Establishment; the Number of Votes Polled for and against the Introduction of the Act; the Number of Readers and Visitors admitted Monthly since the Establishment of such Libraries and Museums; the Number of Volumes contained in each Library; the Number of Volumes issued Monthly to Readers in the Library; the Number of Volumes issued to Readers out of the Library (in cases where there is a Lending Library); the Number or Amount (in Books, Specimens of Natural History, Works of Art, or other Objects, or in Money) of Donations or Bequests to such Libraries or Museums; the Annual Cost of maintaining such Libraries or Museums; and the Amount of the Borough Rate appropriated thereto:"

"And showing in what Boroughs such Libraries and Museums are in course of Formation; with a Report of the present State and Prospects of the same."

It appears that Public Libraries and Museums have been established under the power of this Act, in Bolton, Dover, Leicester, Warrington, and Winchester. The excellent, but ill-supported Museum at Canterbury, was purchased, and made town property; and the Liverpool Museum, the Manchester Free Library, and the Sunderland Museum, though established independently of the Act, have been brought under its provisions. In Oxford a poll was taken in 1852, and the formation of a Town

Museum decided upon. In Birmingham, Exeter, and Sheffield, attempts were made to introduce the Act, but without success, the numbers voting being:

| | FOR | AGAINST |
|---|---|---|
| Birmingham | 363 | 534 |
| Exeter | 118 | 853 |
| Sheffield | 104 | 294 |

These numbers are very remarkable. It is certainly surprising that in such large towns so small a number of the inhabitants took the trouble of expressing their opinions on the subject, and not altogether very creditable to them that so few came forward in support of a good and useful measure. The return further shows that no attempt whatever had been made to introduce Mr. Ewart's Act into Bradford, Bristol, Derby, Devonport, Halifax, Leeds, Newcastle, Nottingham, Plymouth, Portsmouth, Salisbury, Shrewsbury, Wolverhampton, Yarmouth, York, and many other smaller places of less wealth. It is no doubt true that in many of these towns there are good private Institutions, dependent on the funds of private subscribers or chance donations; but the fact that no attempt has been made to render them independent and permanent, whilst it speaks little for the zeal and enlightened energy of the townspeople, seems to indicate great apathy in the progress of science and industrial knowledge generally.

Want of space renders it impossible to give the whole of this return; but the following extracts will serve to show the kind of replies sent, and the mode in which the Act has worked.

### BOLTON.

In accordance with resolutions passed by the Town Council of this borough, a poll of the burgesses was taken on 26th day of March, 1852, under the provisions of the Act 13 & 14 Vict. c. 65, when 662 votes were recorded in favour of, and 55 votes against the adoption of the Act. At a subsequent meeting of the Council, held on the 12th May, a Committee was appointed to carry into effect the provisions of the Act; and such Committee have rented, and are now in the occupation of suitable rooms and have entered into contracts for such portions of the necessary fixtures, &c., as are now required in the Library department, to which their attention is more immediately directed.

At the time of the adoption of the Act, no funds had been subscribed for the purchase of books or works of art, and some difficulties at first presented themselves, the objects of the Institution not being sufficiently understood; it was therefore deemed advisable that a public meeting should be held, and such meeting was convened by the late mayor, and was held on 6th November last. At the meeting a committee was appointed to solicit subscriptions and donations of books and works of art. Up to the present period a sum of 2,000*l.* has been subscribed, and about 120 volumes of books have been presented. Lists of books for purchase have been partially prepared, and the most active exertions are being made for the early opening of the library to the public. The first object aimed at is the formation of a Free Lending Library, which, it is hoped, will be available to the working-classes by the commencement of the ensuing year. A Reference Library is then intended to be provided, of such extent and value as the funds subscribed will warrant. It is expected that the gross amount of subscriptions will reach 3,000*l.* The borough rate will realise about 280*l.* per annum.

The Return draws attention to the inadequate provisions of the present Libraries and Museums Act, and the restrictions imposed on the expenditure of the rate of ½*d.* in the £1. authorised to be levied. It is stated that the Library will contain a fair proportion of the general literature of the country up to the time of its formation; but that, unless some provision be made for keeping up a supply of the current literature, it will fail to meet the requirements of the population of the borough; and it is suggested that this point should be considered by Her Majesty's Government, and that such an alteration of the existing law should be made as will authorise the expenditure of any surplus moneys (after payment of the rent, salaries of officers, lighting and warming, &c,) in the purchase of books and works of art, so as to keep up the interest of the public in the institution, and make it available for supplying the wants of a large population.

The Return further solicits a donation of the works published by the Record Commissioners, and of printed public, historical, and Parliamentary Books, Reports, and Returns.

### LEICESTER.

The Museum for the Borough of Leicester was established by the Town-council, in the year 1848, under the powers of the Act 8 & 9 Vict. c. 43, at which period a building was purchased at a cost, including alterations, &c., of 4,211*l.* 6*s.*, of which the sum of 2,600*l.* was borrowed on mortgage of the building. No subscriptions were received to promote its establishment; but the Leicester Literary and Philosophical Society presented the valuable contents of their Museum to the town.

It is estimated that the average monthly attendance of visitors is about 2,500, the Museum being open to the public (without charge) five days per week.

There is no Library attached to the Museum established under the Act of 13 & 14 Vict. c. 65; but it contains a small library of reference, principally presented by his Grace the Duke of Rutland and the Literary and Philosophical Society.

The number of specimens, &c. in the Museum is estimated at 11,505, which is constantly receiving accessions by donations. The contents of the Museum at present are as follows quadrupeds, 60; birds (foreign, 150; British, 335), 485 insects, British, 1,840; insects, exotic, 1,600; shells, foreign and British, recent, 1,600; shells, fossil, &c., 2,200; fossil bones, &c., and carboniferous fossils, 290; minerals, marbles, &c., corals, echinida, &c., 1,850; sculpture, casts from the antique, models and pictures, 80; manuscripts, casts, coins, botanical specimens, together with other miscellaneous articles, about 1,500;—total, 11,505.

The amount of borough-rate appropriated to the maintenance of the Museum, is ½*d.* in the pound, which amounts to the sum of 239*l.* per-annum, and has hitherto scarcely sufficed to defray the annual expense of interest on mortgages (2,600*l.*), fittings, cases, porter's wages and incidental charges, exclusive of the curator's salary, (50 guineas per annum, which has been defrayed by the Literary and Philosophical Society). As, however, the rate of interest has recently been reduced, and as the annual expense of cases will not in future be so large, the position of the establishment will shortly be more favourable, and on the whole, it may be stated as prosperous; whilst, from the increased attendance of the working classes on holidays, &c, it is evidently producing a beneficial effect upon the public.

The town of Leicester possesses a very valuable collection of ancient books, principally on theology, which is kept in a room at the Town-hall, and which is open gratuitously to the public. The use of this Library, however, from the character of the works, is almost exclusively confined to the clergy and dissenting ministers.

### MANCHESTER.

The Manchester Public Free Library was established by public subscription on Jan. 8th, 1851; transferred to the Town Council, under the provisions of the 13th and 14th Vic., c. 65, at a meeting of the subscribers, held Sept. 2nd, 1852; and opened for public use on the 6th of the same month.

The Library comprises two distinct collections of books; the one for use and reference within the building, the other for circulation. There is no Museum.

The sum subscribed to promote the establishment of the Library was 12,742*l.* 9*s.* Of this amount, 7,013*l.* 7*s.* 7*d.* was expended in the purchase, enlargement, repair, and furnishing of the building, and 4,296*l.* 5*s.* 1*d.* on books and binding.

The numbers of votes polled on Aug. 20th, 1852, for the introduction of the Act were, for, 3,962; against, 40: majority, 3,922.

The number of volumes at present (Feb. 12th, 1853) contained in the Library is as follows:—in the reference department, 16,619; in the lending department, 5,832: total, 22,451.

The number of volumes presented to the Library has been 4,427. Of these, about 2,530 volumes have been placed in the lending Library, and about 1,900 in the Library of reference.

The number of readers and visitors collectively, admitted in the month of September (1852), was 58,166; and from the 1st to the 22nd of October inclusive, 49,379. Up to the latter date, police officers were stationed at the doors, part of whose duty it was to count the visitors on their entrance; but on Oct. 23rd, the attendance of the police was discontinued; and since that time, no means have existed for ascertaining the number of visitors.

The number of readers between September, 1852, and January, 1853, will nearly correspond with that of the books issued in each department of the Library respectively, which is as follows:—reference department, 33,094 volumes; lending department, 37,252 volumes; total, 70,346 volumes. The Library, in these five months, having been open during 126 days, the daily issue has been, on the average, 558 volumes.

The total number of persons admitted, on the production of a guarantee from two burgesses, either of Manchester or of Salford, to the loan of books has been during the before-mentioned five months, 3,735.

## EXHIBITION AT MADRAS.

The following extracts from a Lecture delivered by Dr. Hunter, at Madras, on the 8th of February, respecting the Exhibition of Arts, Manufactures, and Raw Produce, about to be held there in March, will be read with interest:

"One of the principal objects contemplated by this Exhibition is to show to the public at one view what has been done for the arts and manufactures in India; the points in which they are defective; the attempts that have been made from time to time, both by private and public enterprise, to give a proper stimulus to artistic and industrial pursuits; and finally, the progressive improvement which has been slowly but steadily made. In a lecture of this kind I need not waste your time by going back to those periods of antiquity when India was renowned for her arts and manufactures; it is sufficient for us to allude to the fact, and to try to trace out a few of those causes which have led to their deterioration, as India was for many centuries renowned for her arts and manufactures; but these have gradually deteriorated, and other countries are now deriving the benefits of her simple inventions, which the triumphs of science and machinery have carried to such perfection that the original discovery could hardly be recognised in the complicated manipulations of the self-regulating machine. Many thinking persons are inclined to doubt whether we have derived much benefit from the substitution of machinery for manual labour. There is no question that several processes, both in artistic and industrial manufactures, are better performed by the labour of the fingers, assisted with some simple and convenient tool; but most of the efforts of modern science have been directed to the substitution of complicated self-adjusting machinery and steam-power, so scientifically applied as to save the labour of the hands, the eyes, and the minds of our operative classes; for it is now the boast of engineers that they can produce machinery which will do everything but speak. The effect of all this upon our labouring classes has been to reduce wages, to ruin particular trades, and to substitute the cheap and flimsy for the solid and substantial in our staple manufactures; while it has inundated the market with a great deal that is gaudy, meretricious, or vulgar in taste, form, and decoration. In fact, the remark may be justly made, that things are now got up for sale which were formerly made for use; the great rage in all countries for novelty and cheapness having quite thrown into the shade the better qualities of durability and fitness. I could bring forward many instances of the superiority and durability of many old manufactures, but will content myself with two which have been borrowed from the East. One of these is the manufacture of paper (first discovered in China); the other, the weaving of cotton and muslin fabrics, which at one time formed a great source of revenue to India. There are few of our modern papers which will bear the least comparison with the old hand-made papers from linen rags, which used to be manufactured in many parts of Europe during the last century. The great aim of the present day appears to be the production of white paper, without any regard to durability or chemical composition. In fact so little attention is paid to the latter quality, that there is not one of our English papers which is perfectly suited for use in warm climates, and few that will keep good for more than a season or two; the fault lies in its mode of preparation, the damp atmosphere soon causing the size or glue to decompose. This is particularly the case with drawing and writing papers; and the subject is one deserving of attention, as few of our modern prints or lithographs will keep in India.

"The greater durability of the hand-made muslins, checks, and ginghams of India, compared with the cheap machine-made chintzes and cotton fabrics of Europe, is another point of considerable moment to the manufacturing interests of both countries, as the cotton piece goods of Southern India are beginning to rise in estimation with the European community. One of the curious and unlooked-for results of the great Exhibition of 1851 was, satisfying the public that very little is known, even in India, of what the country can and does produce; and many an old Indian was surprised to find how little he knew of the products, the resources, and the industry of the natives. Another startling result which experience is proving to be correct is, that many of the Indian patterns for manufactures are designed and arranged upon better and simpler principles than those which regulate the artistic designs of Europe. I had often suspected this to be the case, and I hope to have the opportunity during the month of March of showing from some simple native designs which have been executed by the pupils in our school, that the natives excel most European artists in the tasteful arrangement of colours; and that a flowing, graceful, and clear style of outline, forms the basis of their instructions in drawing, painting, and the arrangement of architectural ornament. Some of the prizes which I am about to award to-day are for careful drawing of outline patterns, and tasteful arrangement of colours; but I shall defer my remarks on this subject till I have concluded the observations about the contemplated Exhibition. I feel satisfied that the public will be pleased when they see what India really can produce; and I think it desirable that all classes of the community should have an opportunity of knowing, seeing, and judging for themselves, what has been going on in India during the last century."

## BOOKS.

RETURN to an Order of the Honourable The House of Commons, dated 25 April, 1853;—*for*,

RETURN, "from the Year 1840 inclusive, of the DUTY paid on BOOKS: 1. Being of Editions printed to the Year 1801, Bound or Unbound; 2. Being of Editions printed in or since the Year 1801, Bound or Unbound; 3. In the Foreign Living Languages, being of Editions printed in or since the Year 1801, Bound or Unbound; distinguishing the Years, and the Rates of Duty."

| | BOOKS, the Duties on which are regulated by the Date of their Publication, viz.:—Books, other than those admitted under Treaties of international Copyright, and not being Books printed in a British Possession in the English Language (bound or unbound). | | | BOOKS, the Duties on which are not regulated by the Date of their Publication, viz.:—Books admitted under Treaties of international Copyright (conformably to Act 9 & 10 Vict., c. 58). | | | |
|---|---|---|---|---|---|---|---|
| Net Amount of Duty received in the United Kingdom, in the Years, | Being of Editions Printed prior to 1801. | Being of Editions Printed in or since 1801. | In the Foreign Living Languages, being of Editions Printed in or since 1801. | Works originally Produced in the United Kingdom, and republished in the Country of Export. | Works not originally Produced in the United Kingdom. | Books Printed in any British Possession, in the English Language. | TOTAL. |
| | £. s. d. | £. s. d. | £. s. d. | £. s. d. | £. s. d. | £. s. d. | £. s. d. |
| 1840 | 878 4 5 | 1,706 2 11 | 5,779 2 11 | — | — | 129 12 1 | 8,493 2 4 |
| 1841 | 783 9 0 | 1,938 18 10 | 5,633 10 2 | — | — | 95 0 8 | 8,450 18 8 |
| 1842 | 638 7 11 | 1,622 6 9 | 5,517 1 1 | — | — | 100 14 3 | 7,878 10 0 |
| 1843 | 802 2 2 | 1,692 2 6 | 6,432 8 6 | — | — | 84 14 10 | 9,011 3 0 |
| 1844 | 761 9 11 | 1,775 15 10 | 6,874 1 7 | — | — | 69 16 1 | 9,481 3 5 |
| 1845 | 720 12 8 | 2,260 11 7 | 7,435 19 11 | — | — | 75 0 1 | 10,492 4 3 |
| 1846 | 627 18 11 | 1,848 3 11 | 6,554 15 3 | — | 78 18 7 | 90 17 11 | 9,200 14 7 |
| 1847 | 722 19 11 | 1,162 3 7 | 6,444 15 7 | 0 1 9 | 415 3 7 | 98 5 3 | 8,843 9 8 |
| 1848 | 590 13 4 | 1,040 14 3 | 5,635 10 6 | — | 350 15 1 | 144 18 2 | 7,762 11 4 |
| 1849 | 441 13 4 | 803 8 3 | 6,024 9 10 | 0 3 7 | 400 16 0 | 77 13 6 | 7,748 4 6 |
| 1850 | 294 12 10 | 1,079 0 4 | 5,714 19 2 | — | 503 7 1 | 78 1 9 | 7,670 1 2 |
| 1851 | 428 6 4 | 1,003 19 9 | 7,043 14 3 | 0 19 6 | 549 3 8 | 66 14 4 | 9,092 17 10 |
| 1852 | 406 2 4 | 644 2 2 | 4,829 17 0 | 1 11 4 | 1,573 7 0 | 70 1 9 | 7,525 1 7 |
| Rates of Duty chargeable per Cwt. | 1 1 0 | 5 5 0 | 2 12 6 | 2 10 0 | 0 15 0 | 2 12 6 | |

## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ROYAL SCOTTISH SOCIETY OF ARTS, 25th April, 1853.—Robert Ritchie, Esq., Vice-president, in the chair. The following communications were made:—1. "On a method of Communication between the Guards and Engine-Driver of the Railway Train, available also for Passengers." By the Rev. William Mitchell, Rasfield, Portobello. The substantial points of this invention were the same as those adopted by the Delegates of the Associated Railway Companies, only the author proposed that the line, or cord of communication, should be within reach of the passengers. 2. "Description of a new plan of a Railway Signal, and of Communication between Engine-Driver and Guards." By Mr. Daniel Erskine, Musselburgh. In this invention an iron tube, with vulcanized India-rubber couplings extends along the carriages; the engineer and guards being provided with an air-pump, mouth-piece and alarm bell—so that either the bell may be sounded, and thus a signal be given, or the tube may be made use of as a speaking-trumpet. 8. "On Railway Inclines, and on Improvements of the Locomotive Engine, for enabling it to ascend Steep Inclines." By J. Stewart Hepburn, Esq., of Colquhalzie. The author proposed to obviate the necessity for using the present stationary engine, by fixing a spur-wheel on the axle of the driving wheel of the locomotive, which, on coming to an incline should engage in the teeth of a rack, fixed between the rails. 4. "New Designs for Iron Roofs of great clear span—with the results of calculations made with a view to compare these with the best forms at present in use." By R. H. Bow, Esq., C. E., Edinburgh. After some introductory remarks, and insisting upon the propriety of employing roofs of great clear span for large railway stations, the author instituted a comparison between the different classes of structures employed for the principals of roofs, and deduced that the triangular frame (in which the rafters constituted the main compressed member of the fabric) deserved to be preferred before all arched, compound, or other forms, when an inclined surface was demanded by the covering, of the character required for slating. And he further showed that, where untied or abutting principals could be used, rafters, when made straight and treated as bridges, formed principals of a very economical character; but that, for such a situation, rigid arched structures were quite inadmissible. He arranged those straight-raftered principals (in which the rafters were the main compressed members) into two classes: the first embracing those which were tied, or exerted only vertical pressures on the supports; and the second those which were untied, or of the abutting character. The principals of the tied class were of two kinds; in the principals of the first variety each rafter acted as a bridge, but the principals of the second partook of the nature of a framed girder. 5. "Method of Escape from a Ship in Distress, particularly for Females and Children." By Mr. A. M'Coll, Auchtermuchty. The author recommends the addition of two life belts to a slide block made to travel backwards and forwards on a stout rope fastened to the ship and the boat. Specimens of Morthan, or the Reed Mace (*Typha latifolia*), from the Black Loch, near Oban, and of the nutritious Meal obtained from it, were exhibited by Mr. Malcolm MacCallum; who considered that its fibre was suitable for textile fabrics; and that the external coating of this plant might be used in the manufacture of Paper.

Institution of Civil Engineers, May 10th, 1853.—J. M. Rendel, Esq., President, in the chair. The evening was devoted to the discussion of Mr. Coode's paper, "Description of the Chesil Bank (Portland)." It was remarked, as to the position of large shingle, that on any shelving shores, where the waves could only act upon the beach at or about the time of high water, the larger pebbles were found near the top, after the occurrence of storms, because under such circumstances only did the waves exert sufficient power to break heavily upon the beach; under light winds the force of the waves was expended in the shoal water, before reaching the beach. Instances were given of the motion of shingle, as affecting the entrances of harbours, which was the main practical point to be considered by the civil engineer. At Lowestoft, just as much sand was washed up as supplied what was required for ballasting the vessels frequenting the port. At Sunderland, the cross action of the waves, influenced by the ledge of rocks outside the new harbour, caused the deposit of shingle on the opposite sides of the groins. The work of Lamblardie on the motion of shingle was referred to, as corroborating the views of the author of the paper, on the motion of "beach" by the wind-waves, and giving valuable facts bearing on the subject. Viewing the relative position of the geological strata of the coast to the westward of Portland, it was considered probable that the extent of chalk exposed to the action of the waves had, at a former period, been much greater than at present; that the disintegration of the underlying greensand had expedited the fall of the chalk and flints, and thus supplied the material for forming the banks. The travel of pebbles was gradual, and distinctly up and down the beach, having an onward tendency in its upward motion, and yielding to the force of the then existing wind-wave. At an angle of about 45° the greatest amount of travel, or onward movement, was observed; but the size of the shingle more especially was determined by the amount of undulation.

Royal Institution, May 9th, 1853.—General Monthly Meeting, George Dodd, Esq., F.S.A., Vice-president, in the chair. John Burnett, Esq., Edward Enfield, Esq., William Charles Henry, M.D., F.R.S., Edward Holland, Esq., David Macloughlin, M.D., Charles Otter, Esq., George Taddy Tomlin, Esq., Edwin Truman, Esq., and Frederick Weber, M.D., were duly elected members. Thomas William Brande, Esq., F.R.S., L. and E., was unanimously re-elected Honorary Professor in the Royal Institution. The thanks of the members were voted to the Rev. W. Taylor, F.R.S., T. H. Huxley, Esq., F.R.S., John Conolly, M.D., W. Brockedon, Esq., F.R.S., and to Dr. Lyon Playfair, for their Lectures on April 8, 15, 22, 29, and May 6th.

## PROCEEDINGS OF INSTITUTIONS.

Dunmow.—On the 5th instant, a very interesting and useful Lecture was gratuitously delivered by Dr. W. E. Humble, of London, on "Poisons," with reference, more especially, to their effects on the animal system, and the most ready means of applying remedies in cases of emergency. He commenced with some prefatory remarks on the general nature of poisons, avoiding throughout, as far as possible, the use of technical terms, and employing only such as were likely to be generally intelligible. The poisons to which special attention was directed, were those which from their general use, either in domestic economy or the arts, and various branches of industry, were liable to be mistaken for other and harmless substances; and comprised oxalic acid, lead, and its preparations; copper, and its salts; arsenic, and opium. In each case, the general characters of the poison were descanted upon; the modes of distinguishing it from substances which resemble it were shown, and the most appropriate and easy tests were exhibited for each substance; the simplest and most readily available antidotes were also pointed out, and, where possible, the mode of their preparation was explained. The numerous illustrations and experiments were highly successful, and well calculated to aid in rendering the subject more generally intelligible to a non-professional audience.

Royston.—A large audience, composed of members and friends of the Mechanics' Institute, assembled on Tuesday, the 3rd instant, to hear an address from Mrs. Chisholm, on "Emigration." J. G. Fordham, Esq., occupied the chair. Mrs. Chisholm, after giving much information which would be valuable to the emigrant, stated, that on her return to Australia, she intended to search out the husbands and fathers in Australia, of whom there were some thousands, who had left their wives and families in this country; in transmitting sums of money from these men, for the benefit of their wives, families, or aged relatives, her efforts would be fruitless, unless aided by the influential members of society in this country, who might undertake to see that the money sent be well expended. A vote of thanks was unanimously accorded to Mrs. Chisholm.

Winchester.—The close of the eighteenth lecture session of the Mechanics' Institution, was celebrated by a soirée, at St. John's-house, on Wednesday week. The chair was taken by the Rev. Charles Walters, M.A., the president. The City members, Sir J. B. East, Bart., and J. B. Carter, Esq., the Rev. F. Bugby, and the Worshipful the Mayor, also took their seats on the platform. Addresses were delivered by the gentlemen named; and the choir of the Cathedral sang several glees and songs. Mr. G. Grossmith, of London, also contributed to the amusements by recitations from the modern humourists.

## MISCELLANEA.

**Newspaper Stamps.**—A return, obtained on the motion of Mr. Bright, has been published of the names of all the newspapers in the United Kingdom to which halfpenny stamps were issued during the year 1852. It appears from this return, that among the London daily papers, 10,000 halfpenny stamps were issued to the *Morning Herald*, and that the duty paid thereon amounted 20*l*. 16*s*. 8*d*. The same number of such stamps was issued to the *Daily News*. The *Evening Journal* had 2,000 stamps; the duty was 4*l*. 3*s*. 4*d*. The *Times* had 10,650,000 halfpenny stamps, and the duty paid amounted to 22,187*l*. 10*s*. Among the London weekly papers the *Illustrated London News* takes the lead with respect to the halfpenny stamps, for it figures in the list with 1,933,728 such stamps, at a duty of 4,028*l*. 12*s*. *Lloyd's Weekly Paper* had 132,674 halfpenny stamps; duty paid, 276*l*. 8*s*. 1*d*. *News of the World*, halfpenny stamps, 81,700; duty paid, 170*l*. 4*s*. 2*d*. *Weekly Dispatch*, halfpenny stamps, 218,852; duty paid, 455*l*. 18*s*. 10*d*. Of English provincial papers the following had to make use of the largest issues of halfpenny stamps: *Leeds Mercury*, 512,000 stamps; duty paid, 1,066*l*. 13*s*. 4*d*. *Liverpool Mercury*, 400,500 stamps; duty paid, 834*l*. 17*s*. 6*d*. *Manchester Courier*, stamps, 294,000; duty paid, 612*l*. 10*s*. *Manchester Examiner*, 432,018 stamps; duty paid, 900*l*. 0*s*. 9*d*. *Manchester Guardian*, 588,000 stamps, duty paid, 1,225*l*.—Among the Welsh papers the only one worth noting is the *Monmouthshire Merlin*, with 4,000 halfpenny stamps, for which 8*l*. 6*s*. 8*d*. duty was paid. This paper stands highest on the Welsh list, and *Yr Amersan*, a paper published in the language of the country, is lowest; it had 668 stamps, and paid duty for them to the amount of 1*l*. 7*s*. 10*d*.—In Scotland, the *North British Advertiser* had 156,600 stamps, and paid 325*l*. *North British Mail*, stamps, 43,500; duty paid, 90*l*. 12*s*. 6*d*.—And in Ireland, the *Nation* had 23,900 stamps; duty paid, 49*l*. 15*s*. 10*d*. The *Telegraph*, 22,800 stamps; duty paid, 47*l*. 10*s*.: and the *Tablet*, 16,360 stamps, on which 34*l*. 1*s*. 8*d*. was paid as duty.—*Times*.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the Journal regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 5th May*, 1853.

191. Local Acts—Reports of the Admiralty.
311. Election Expenses—Abstract of Return.
396. Exchequer—Account.
406. Cheese—Accounts.

*Delivered on 6th May.*

383. Athlone Election—Minutes of Evidence.
435. Common Lodging-houses—Supplemental Report.
441. Bill—Bankruptcy (Scotland).

*Delivered on 7th and 9th May.*

331. Select Committees—Return.
341. Irrigation (Godavery, &c.)—Return.
358. Appeals (India)—Return.
445. Committee of Selection—Tenth Report,
275. Finance Accounts—Classes 1—8.
81 (1). Capture of Bruné—Further Return.
330. Callan Union Workhouse—Copy of Report, &c.
389. Waterford County Election—Minutes of Evidence.
420. Reigate Union—Correspondence.
421. Westmoreland Lock Hospital—Communications.
422. Newspaper Stamps—Returns.
439. Books—Return.
447. Bills—Vaccination Extension.
448. ,, —Whichwood Forest (as amended by the Select Committee).
441. ,, —Courts of Common Law (Ireland), amended in Committee, and on re-commitment.

Poor Law Board—Fifth Annual Report.
Superior Courts of Common Law, &c.—Second Report of the Commissioners.
Emigration (Australian Colonies)—Papers.

*Delivered on 10th May.*

191. Local Acts—Reports of the Admiralty.
377. Rye Election (Further Inquiry)—Resolutions of the Committee.
381. Maidstone Election—Report from the Committee.
385. Vessels Wrecked—Return.
394. Knaresborough Election—Report from Committee.
401. Berwick-upon-Tweed Election—Ditto.
432. National Schools (Ireland)—Regulations respecting the Sale of Books.
313. Clare Election—Copies of Inquisitions, &c. &c.

*Delivered on 11th May.*

437. Rajah of Sattara—Copy of Letter, &c.
442. Cathedral and Collegiate Churches—Return.
375. Leicester Election—Minutes of Evidence.
416. Rye Election—Ditto.
454. Bill—Excise Duties on Spirits.

Manning of the Royal Navy—Correspondence, &c.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

### *From Gazette, 6th May*, 1853.

*Dated 18th March*, 1853.

672. G. R. Lucas—Raising water, &c., from mines.

*Dated 5th April.*

809. Dr. W. W. Sleigh—Counteraction reaction motive power engine.
813. J. O'Connor—Coke from raw peat.

*Dated 8th April.*

845. W. F. Smith—Vessels for heating liquids.

*Dated 18th April.*

931. R. F. Sturges—Apparatus for vegetable or other infusions, &c.
933. W. M'Naughton—Printing yarns for carpets, and printing carpets, &c.
935. W. and F. B. Fawcett—Manufacture of carpets.
937. J. J. Gonin—Disengaging silk of gum.

*Dated 19th April.*

939. T. Newey—Fastenings for dress.
941. L. A. Beauvain—Machinery for obtaining wool, &c., from fabrics, and rendering them suitable for employment again.
945. C. Böhringer and G. Clemm—Soda and potash.
949. A. Blair—Propelling.

*Dated 20th April.*

951. S. Weight—Ventilation.
953. H. M'Evoy—Construction, &c., of door-bolts.
955. R. A. Brooman—Inhaling-tubes. (A communication.)
957. Sir W. S. Harris—Lightning-conductors for ships.

*Dated 21st April.*

963. J. Petrie—Steam-engines.
965. W. Robjohn—Meter for liquids.
967. W. E. Newton—Machinery for bending wood, &c. (A communication.)

*Dated 22nd April.*

968. T. F. Finch—Buttons.
969. J. Davis—Thrashing-machines.
970. W. Sager—Propelling.
971. W. Hunter—Cutting and planing.
972. W. and J. Asquith—Cleansing, preening, &c., wool, flocks, &c., from cards, &c.
973. W. Beard—Needles, and manufacture of the same.
974. C. M. T. du Moray—Preparing oils, and burning the same.
975. J. A. Drieu—Cutting pile of velvets, &c.

*Dated 23rd April.*

976. E. O. Aston and G. Germaine—Coating wood, &c., exposed to sea-water, &c.
978. T. Knowles—Machinery for picking warps.
979. F. J. Wilson—Improved wheelbarrow.
982. J. Geddes—Improvements in oars.
983. W. Johnson—Combing wool, &c. (A communication.)
984. J. Napier—Separating metals from ores, &c.
985. G. F. Wilson, W. H. Hatcher, and J. Jackson—Apparatus for moulded candles.
986. R. Johnson—Apparatus for drawing wire.

*Dated 25th April.*

987. E. O' Connell—Method of feeding infants and invalids.
988. H. E. Hoole—Self-acting speed-regulator and safety-break.
989. C. L. Debordes—Instruments for measuring pressure and temperature of air, steam, &c.
990. J. Chatterton—Covers for wagons, &c.
991. R. Davies—Reaping-machine.
992. W. Tillie—Printing shirting fabrics.
993. J. Emery—Construction of gigs, &c.
994. W. Johnson—Retarding and stopping railway trains.
995. J. Bernard—Casting metals, &c.

*Dated 26th April.*

996. J. B. Sheath—Fire-arms.
997. J. E. Joffriand and R. Riviere—Washing earths containing gold.
998. G. K. Geyelin—Manufacture of white oxide of zinc.
1001. J. Pym—Building materials.
1002. A. and J. Le Roy and E. Pavy—Production of lace, &c.
1003. U. Scott—Tubular rods and rings for furniture.
1004. M. Poole—Porcelain, &c. (A communication.)

*Dated 27th April.*

1005. W. Johnson—Machinery for preparing, spinning, &c., cotton, &c.
1006. F. G. Underhay—Reaping and mowing machines.
1007. G. F. de Fonveille—Filtering machine.
1008. B. M. A. Langlois—Instruments to be applied to gas-burners. (A communication.)
1010. J. Hetherington and J. and E. Dugdale—Construction and application of models for casting, &c.
1012. R. Howson—Weavers' harness. (A communication.)
1013. J. H. Johnson—Apparatus for sustaining bodies in water. (A communication.)
1014. J. W. Gale—Permanent way.
1015. W. Johnson—Apparatus for marking, ruling, and ornamenting surfaces. (A communication.)
1016. G. Turner and R. Holloway—Unfermented bread, &c.
1017. G. Critchley—Regulating heat, and supply of water in heating apparatus.
1018. J. Palin and R. Sievier—Distillation, &c.
1019. S. Groves—Apparatus for pumping air.
1020. J. A. Bruce—Hay-ricks, and fastening horses, &c.
1021. T. Culpin—Steam-boilers, &c.
1022. W. Williams—Combination of materials for trays, &c.
1023. W. Reid—Testing insulation of telegraph wires.
1024. R. J. Gatlin—Distributing power.
1025. J. F. Kingston—Galvanic batteries.
1025. W. F. Thomas—Sewing or stitching machinery.

*Dated 28th April.*

1028. J. Hetherington—Reels.
1030. E Bird—Construction of certain vehicles.
1034. Sir J. S. Lillie—Roads, floors, &c.
1036. T. Revis—Single seed-drilling and dribbling machinery.

APPLICATION WITH COMPLETE SPECIFICATION FILED.

1009. S. Plimsoll—Cleansing, fining, &c., ale, beer, &c. 27th April, 1853.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 6th May*, 1853.

658. John Ryall Corry and James Barrett Corry, of Queen Camel, Somerset—Invention of a new mode of sewing gloves.
668. Charles Frederick Day, of Ashford, Kent, and John Laylee, of Rye, Sussex—Improvements in sleepers and other parts of the permanent way of railroads.

*Sealed 7th May.*

670. Charles Troupeau, of Paris—Invention of an improved diurnal reflector.
688. George Shadforth Ogilvie, of Stapleton, near Bristol—Improvements in candlesticks and lamps.
693. William Tudor Mabley, of Manchester—Improvements in ornamenting glass, and other transparent or partially transparent substances, for windows and for other purposes.
890. Mathurin Jean Prudent Moriceau, of 39, Rue de l' Echiquier, Paris—Improvements in sharpening and dressing the cards of carding-machines and the clippers and cylinders of shearing-machines.
917. John Brannis Birch and Eugenius Birch, of Cannon-row, Parliament-street—Improvements in forming drains, and in introducing pipes or tubes into the earth.
1103. Edward Schischkar, of Halifax, York—Improvements in dyeing and colouring yarns and textile fabrics.
1104. Edward Schischkar, of Halifax, York—Improvements in colouring or staining yarns and textile fabrics.
1196. James Power, of 34, Rue de Penthièvre, Paris—Improvements in silvering all sorts of metals and glass.
59. Francis Parker, of Northampton, and William Dicks, of Leicester—Improvements in boots, shoes, and that kind of spatterdashes, termed Antigropelos.
159. Reuben Plant, of Brierly Hill, Staffordshire—Improvements in the construction of glass-house furnaces.
608. John Powis and Jabus Stanley James, of Watling-street, City—Improvements in machinery, for slotting, tenoning, morticing, grooving, drilling, boring, and vertical planing.
620. John Gilby, of Beverley, Yorkshire—Improvements in fire-arms.

*Sealed 9th May.*

696. John Down Gordon, of Eldon-street, Finsbury—Improvements in tuning pianofortes.

*Sealed 10th May.*

703. Auguste Baboneau, of Paris—Invention of an improved apparatus for melting and mixing asphalte with bitumen and other substances.
717. William Davis, of Leeds—Improvements in machinery for cutting files.

*Sealed 11th May.*

718. William Edward Middleton, of Birmingham—Invention of a new or improved circular-saw bench.
723. Daniel Henwood, of Charlton-street, Somers-town—Improvements in machinery for registering the number of passengers or persons entering public vehicles or vessels, theatres, bridges, or other places where it may be desirable to ascertain the number of persons entering therein.
724. Charles Seaton, of Fitzroy-street, Fitzroy-square—Improvements in the manufacture of metal tubes, and in the machinery employed therein.
732. Robert John Smith, of Islington—Improvements in machinery or apparatus for steering ships and other vessels.
801. John Trestrail, of Southampton—Improvements in raising sunken vessels or other materials from under the water or in the sea, or to prevent them from sinking.
803. James Nasmyth, of Patricroft, near Manchester—Improvements in machinery or apparatus for packing and compressing cotton, wool, and other substances.
809. William Green, of Islington—Improvements in the manufacture of textile fabrics, and in machinery or apparatus for effecting the same, parts of which improvements are also applicable to printing and embossing generally.
847. Henry Thomson, of Clitheroe—Improvements in apparatus to be used in dyeing, bleaching, and other processes in which goods are operated upon in the piece.
853. Stephen Spalding, of Hogsthorp, near Alford, Lincolnshire—Invention of an apparatus or machine for the manufacture of pantiles used in building purposes.
860. William Hall, of Nottingham—Improvements in rotary steam-engines, governors, and apparatus for supplying boilers with water, and for regulating the same.
953. Richard Archibald Brooman, of 166, Fleet-street—Improvements in the manufacture of sugar. (A communication.)
461. Asa Willard, of St. John's, New Brunswick—Improvements in machines for manufacturing butter, to be called, "A. Willard's Butter-machine."
570. Joseph John William Watson, of Old Kent-road—Improvements in illuminating apparatus, and in the production of light.
616. Francis Preston, of Manchester—Improvements in the manufacture of bobbins and spools.
651. Charles Heard Wild, of St. Martin's-lane—Improvements in fishes and fish-joints for connecting the rails of railways.
667. John Henry Johnson, of 47, Lincoln's-inn-fields, and Glasgow—Improvements in steam-engines. (A communication.)

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| May 7 | 3457 | Self-acting Water-closet and Service-box | Stock and Son | Birmingham. |
| " 10 | 3458 | An Audible Signal Apparatus, for railways, steam-vessels, and other purposes | David Salomons | 3, Great Cumberland-place. |

# SOCIETY OF ARTS.

**FRIDAY, MAY 20th, 1853.**

## TWENTY-FIRST ORDINARY MEETING,

### *Wednesday, May 18th,* 1853.

The Twenty-first Ordinary Meeting of the Society was held on Wednesday, the 18th instant, the Rev. James Booth, LL.D., F.R.S., in the chair.

The following were elected Members:

Chadwick, David, Salford.
Gibb, Capt. C. J., R.E., Woolwich.
Graham, William, 74, Old Broad-street.
Gregg, S. G., 43, Rectory-place, Woolwich.
Jones, Arthur O'Brien, Epsom.
Lloyd, George, M.D., Norton-lodge, near Warwick.

A paper was read "On the Proposed Central American Canal, and its Relations to Commerce," by A. G. Findlay, Esq., F.R.G.S.

The existence of the American continent in modern European history is a recent fact, not older than very many of the most familiar ecclesiastical and other edifices around us; yet European art and civilization have almost totally displaced the original systems which existed at the period of the re-discovery by Columbus. The Spanish and Portuguese influences have extended in the central portions chiefly, or those more assimilated to the parent climate, not farther north or south than 30° or 35°, while the more vigorous Anglo-Saxon race have industriously pursued wealth and commerce in the more temperate or changing climates of the north or south.

Yet during the very earliest periods of European possession the Isthmian Canal was a great desideratum, and Cortes obtained a grant of land in Tehuantepec, which he proposed to enhance the value of, by connecting the two oceans across it. This fact, which was subsequently often mooted, is important to be remembered now, in the present immensely increased necessity for it.

The object of this paper will be to show the peculiarity of the geographical position of the American Isthmus, and, consequently, the peculiarity of its climate; of some hitherto unnoticed influences in the current systems which centre here, and which bear most strongly upon any system of navigation;—then to show what new fields for commercial enterprise it will open, and what existing advantages it will increase.

The revolution of the earth and the solar heat causes the phenomena of the trade winds within the tropics. These blow from N.E. and S.E., meeting near, but not *on*, the equator,—a fact due to the unequal distribution of land and water in the two hemispheres. The line of junction is between latitude 4° and 10° N., and Panama lies in this interval, and suffers accordingly from the calms and changing winds due to its position. This belt of calms is a very great obstacle to ships crossing it in the Atlantic and Pacific. It has a great influence on climate also; for the trade winds being evaporating winds, on meeting, deposit the water with which they are then saturated, and Panama during the time of the sun's N. declination is deluged with rain, in quantities sufficient to fill the high level of any canal which might be formed with locks.

To the direction of winds that of currents is mainly owing, and the waters of each ocean circulate around the parallel of 30° N. or S. In the Atlantic the water is all forced into the Gulf of Mexico, and is presumed to raise its normal level, from the fact that the Gulf-stream rushes out of it in an opposite direction. This crossing the Atlantic from W. to E. ameliorates the climate of the British Islands, which would otherwise be like Labrador, in the same latitude. If the same process went on in the Pacific, and its waters were all propelled to westward, the Pacific side would be many feet lower than the Atlantic; but a current, hitherto overlooked, runs from W. to E. *under the belt of calms*, entirely across the Pacific into the Bay of Panama, and thus compensates the level, which is sensibly the same. The currents of the Pacific set up the coast of South America towards the Bay of Panama, and another, the continuation of the Japanese current, unnoticed hitherto, but an analogous current-stream to the Gulf-stream of the Atlantic, runs down the coast of Mexico and California also toward the Bay. Thus, Nature seems to indicate, both by winds and currents, that ships crossing the ocean from E. to W. must do so between 30° and the equator, and from W. to E. in a higher latitude than this. In the large diagrams, which illustrated the paper, these currents were clearly shown, and were on Mercator's projection; which, though indispensable in navigation, gives very erroneous notions of the properties of the sphere, which in extended Pacific voyages must be taken into account.

Thus, the apparently direct track on the chart from Panama to Shanghae, China, is W. 8° 37′ N.—a line which intersects the Sandwich Islands, and is 8,982 miles in length, the Sandwich Islands lying about midway. But this is very far removed from the shortest line, which from Panama runs entirely inland along the west side of America near Behring's Strait, down the eastern side of Tartary and the Korean peninsula, which line will be 8,089½ miles, or just 900 miles shorter than the rhumb, or apparent direct course. Such being the case, it is manifest that a ship may sail in a course anywhere between these two lines, and will shorten the distance the nearer she keeps to the course in the higher latitude; so that the direct course to or from China will lead up the west coast of America—say as high as San Francisco, and then across the ocean nearly up to the Aleutian Islands, and down the Japanese group, by which she would save in distance about 450 miles. As an extreme case, it may be mentioned that a line of 8,982 miles in length from Panama to China—that is, the same as taken through the Sandwich Islands, may be drawn across the western part of the Atlantic, through Iceland, between Spitzbergen and the North Cape, through Siberia and Chinese Tartary to Shanghae. This may appear paradoxical upon Mercator's chart, but it is correct, and may serve to dissipate many preconceived notions of distance between these widely separated countries.

Of the navigation of the North Atlantic, either by steam or sail, it is needless to speak; the distances, times, and relays for coaling have been long tried and tested, and therefore it may be presumed that in each case these particulars are minimised. But the steam voyages to Australia, entering upon new ground, have been most decided failures as yet, and in almost every case have been beaten by ordinary sailing-vessels. There must be some general reason for this series of failures, besides the inefficiency of the ships, and I think it may be sought for in the great variety of circumstances that the navigation around the Cabo Tormentoso—the Stormy Cape of the Portuguese, or the Cape of Good Hope of the Dutch—will carry a vessel through. It is seen that the whole system of winds and currents are intersected in this voyage, and therefore that in the main they are both adverse, and the actual distances to be traversed are very great.

We come now to that part of our subject which relates to the absolute distances which will be thrown open to shipping by the canal, compared with those at present followed; or, what is still more important, the absolute time that it may be expected may be saved by it. With respect to our Eastern possessions in India, China, and Australia, there is a wonderfully great similarity in the distances which must now be sailed over to reach any of them from England. Thus, the mean sailing distances, which we take from Captain Wise's interesting analysis of 100 voyages, is, from England to Bombay, 13,424 miles—time, 115 days, 15 hours; from England to Madras, 13,629 miles—time, 106 days, 16 hours; England to Bengal (Calcutta), 14,405 miles—time, 105 days, 7 hours; and from England to China, 15,238 miles. The distance necessary to be sailed to Adelaide may be about 14,200 miles, and to Sydney, 15,500 miles, around the Cape of Good Hope, or, by steam, 13,880 miles, to be performed in 63 days.

The shorter routes—known as the overland routes from the Mediterranean to the Red Sea, a portion of which has been long established—would make the distance to Sydney, *viâ* Torres Strait, about 13,288 miles; but in the outward passage, the wind and current would be almost always adverse, so that this length must be increased, on the score of current alone, perhaps 1,000 miles. The time calculated by Captain Hamond for this route is 75 days. The distance and time to the westward of Australia, which avoids all the terrors to steam navigation in Torres Strait, would be about the same. Now, it will be seen that these distances represent considerably more than half the circumference of the globe; moreover, they lead through seas where the winds are, at seasons, in most furious opposition to their progress—the currents, also, most violent. It is only of late years, that to beat against the adverse monsoon has been attempted; and it is stated, that one of the fine steamers employed in the oriental transit was compelled to burn nearly every available part of her construction, when, having run short of fuel, deck, spars, rigging, and cargo, were all cut up. Such an occurrence in the Pacific would be most serious.

Turning our attention to the routes in the opposite direction, or across the Isthmus and Pacific, a very different order of navigation will exist. The Pacific deserves its name; fine weather and moderate breezes prevail almost entirely across it—the western portions, perhaps, excepted. In these respects, it differs widely from the Atlantic, where, perhaps, from the accumulation of the trade-winds over the eastern continent, they are impelled with great force on the comparatively narrow breadth of the ocean.

The shortest distance across the Atlantic, from the Lizard to Chagres, and which, perhaps, might be implicitly followed in the homeward route, is 4,666 miles, which, if a steam-vessel can make good ten knots an hour, would be traversed in 20 days, exclusive of the relay if necessary (at the Bermudas). In the first part of her voyage out, the mean direction of the wind and current would be adverse, or favourable on her return; and the latter portion of this would be reversed, so that these would neutralise each other, and the distance remain the same. The passage of the canal could be made in a few hours.

The shortest distance from the Gulf of San Miguel to the North Cape of New Zealand is 6,715 miles, and leads, as shown, thence to Sydney, about 1,060 miles farther, which, at ten knots, would occupy thirty-two days; so that the entire distance from the Lizard to Sydney by this route is 12,460 miles, or 1,400 miles shorter than by the Cape of Good Hope, and might be done in fifty-three days' actual steaming; and as it is presumed that this course would be nearly the best for a sailing vessel, it is shorter by nearly 3,000 miles than the eastern route for this class.

But there is another feature in this route. The winds are favourable for the passage either way; and outwards, after passing the Galápagos, she will be assisted by a current of twenty miles per day as far as the tropics, by which the distance will be shortened some 300 miles; beyond this they will probably balance themselves. It is presumed that one stoppage for coal, &c., will be sufficient between the Isthmus and New Zealand or Sydney. By the chart, Tahiti appears to be the best placed, as being midway, and in the line; but there are some reasons why another port would be preferable. In the first place, the Society Islands are under French domination, and might not be so advantageous to British ships as one more independent. I, therefore, beg to propose that the Gambier Islands, or Manga Reva Group, which possess all the requisite advantages of, with some superiority over, the Tahitian Islands. In the first place, it has a good harbour, and abundance of fresh water. It is lofty, 1,250 feet high, and at present uncolonized. It lies near the great circle route, 3,700 miles from Panama, and 3,960 from Sydney. Of still greater importance, it lies to windward of the Low or Dangerous Archipelago, which, with this exception, are exclusively coral formations. Tahiti, then, would be a most dangerous landfall either for a steamer or sailing vessel. Should a steamer become disabled, or exhaust her fuel, before reaching her port, she might not be able to weather it, when she would drift by wind and current to Tahiti; whereas, if she made for the latter, and missed, then the next chance would be to make for the Cook's Islands, 500 miles to leeward, or, still worse, for the Tonga Group, 1,400 miles to leeward. It is presumed that a sailing vessel could always reach, with proper management, to any port of New Zealand, from the Canal, in forty to forty-five, and probably in thirty days; and if thirty days be occupied from Europe to the West Indies, this will be greatly under the time at present occupied. The return route round Cape Horn, that terror of navigators, would never occur; all Pacific return navigation would be through the Canal.

Of the American ports nothing need be said; the advantages of time gained by the transit of the Isthmus are manifest.

We have before said that the shortest route to China and Japan will be along the American coast as high as San Francisco. In the westward passage, towards the southern ports, perhaps the same advantages may be gained by making for the Sandwich Islands; and if this indirect route be taken, it will be about 9,000 miles, which might occupy a quick steamer forty to forty-five days: she would have fair winds the whole voyage, and be advanced by the favourable current to the extent of about 600 miles. But the return voyage between these ports is a different matter, and, it is contended, would be lengthened by these adverse circumstances to a length equivalent perhaps to 1,800 or 2,000 miles, that is to 10,800 or 11,000 miles, which would quite neutralise any advantages of the Canal. But if the great circle route be taken along Japan, the actual distance will be 8,400 miles, which might be steamed over in thirty-five days, and would be assisted in every probability 700 miles on the voyage by currents. The winds would be favourable during the whole course, and this too might be equivalent to as much; so that the figures would stand as 6,600 to 11,000 miles for the low and high latitude.

Without dilating on other or shorter voyages, it may be safely asserted, that for all the eastern ports of Australia, China, or the Asiatic Archipelago, although they lie from 60° to 120° of longitude nearer to us by the eastern route, yet they may be reached by tracks shorter by from 1,200 to 3,600 miles, with every advantage of wind and current, which may perhaps be taken at so much more.

It has been shown that in long voyages there are belts of calms; absolute calms must be crossed, particularly in the Atlantic, which narrow space swallows up on a mean seven days, varying in the 100 voyages cited by Mr. Wise, from three to fifteen days. In the 112¼ days mean passage to India, 36¼ days are occupied in calms and light airs; 63¼ days in fair winds; and 12¾ days in foul winds. By the use of auxiliary steam, the calculation is, that by slight auxiliary steam-power the Indian voyage may be shortened to 85 days, or by steam up to a better track to even 69 days.

In the Pacific the winds are comparatively light, and perhaps, as a mean, would not command more than seven or eight knots in a sailing vessel. Supposing, therefore, that auxiliary steam is used to make up the speed to ten knots, much even of this is neutralised; for supposing the ship to be propelled with this velocity, and the wind is abeam with a strength equivalent to eight knots, she will shift the wind two or three points ahead, and cause it to be still more adverse with lighter breezes. It may be, even, that a very light wind aft, may with quick speed come out dead ahead, so that sails are worse than useless. This renders consideration to the currents of much greater importance.

The progress of steam in the Pacific will depend on the abundance of coal. Fortunately Nature has been as bountiful in this respect here as elsewhere. For the Australian route it must be taken to the intermediate station, and Talcahuana or New Zealand afford ready sources. In the north we have more convenient sites. It has been said by Dr. Coulter, that he found it in the Galápagos, but this must reasonably be doubted. It has been found up the Columbia River. In Admiralty Inlet, and in Vancouver's Island, it is very abundant and excellent. It probably abounds, and certainly exists, in Cook's Inlet. It has been worked in Aliaska. It is found in the Aleutian Islands, and in Behring's Strait. It is worked in Japan, and in the Philippine Islands; and with a ready and certain market, it might be worked in all these places. Wood has been proposed and tried. It may be had for the cutting in the north and south, but its weak powers, I hear, cannot make it to be depended on for steam-fuel; a slight addition of coal greatly increases its strength, and it is here suggested, that *bitumen* might be available as an adjunct. There is a bitumen spring near Santa Elena Point, in Ecuador, close to the sea. It has been noticed by Dampier, and still exists as found by Lieutenant Wood, in H. M. S. *Pandora*. Another is found between Point Dume and at Point Vicente, in Upper California, and it becomes an interesting question whether these and others might not be used in *improving* fuel.

A few words as to the commerce it will open up, and bring to our own country. There is not a richer mineral part in the world than the west portion of Ecuador and Peru. The great distance it is from Europe, around Cape Horn, precludes anything but the most valuable of its products reaching us; but there can be no doubt but that a shorter transit will confer great value upon many natural products which are now most abundant and worthless. One very important item will be thus greatly increased,—the vast deposits of guano on the Peruvian coasts, from which millions of tons may be brought here. The alkaline compounds which cover the plains of Bolivia may be brought into service, and the immense metallic deposits will thus be made one-half, or rather two-thirds, nearer Europe.

All the products of South Western America will bear a proportionately increased value, and create an outlet for industry and speculation. In the north, our American brethren are vigorously pursuing commerce in their new region of California, and one fact will prove what openings there are for increase of commerce. In the month of January, 1853, there were cleared from the Port of San Francisco, 128 vessels, of the aggregate burthen of 47,194 tons. Five years since, a few stray ships found their way here annually, in search of water from the poor and destitute Spanish occupants. A new expedition is now to be fitted out at New York for the exploration and advancement of the capabilities of the N. W. coast. American colonies are being founded all along the coast to the northward, pioneers of future industry and wealth. Our own territories to the northward are as yet untried and unvisited, but possess all the capabilities of northern Europe. Russian America is a *terra incognita*—its capabilities are unknown.

The Americans boast that the commerce of the Pacific will be their inheritance;—let us see what it is. A chart with its array of names gives a very exaggerated notion of the lands between the eastern and western worlds. They are, with the exception of the few volcanic groups, mere specks or narrow stripes of land, even with the water's edge, and are immensely populous. The entire insular population of the Pacific has been rated at 20,000,000, but from a careful summary it does not much exceed 1,500,000 to 1,750,000, and this including New Zealand and Australia. The area of the Caroline Islands does not exceed that of the town of Liverpool, yet the population amounts to above 500 per square mile. This is the case with all the coral islands. So that the whole care of the natives must be in procuring food. The only articles as yet gathered is *biche de mar*, or sea slug—an aphrodisiac for China, the pearl-oyster shell, and tortoise shell. The two first might probably be cultivated like our own oyster-fishery, the latter is nearly extinct. Arrow-root and cocoa-nut oil might be had in small quantities, but would not pay as yet. Of the larger islands in the Western Pacific we know little. Their capabilities are quite undeveloped, and are now only being awakened. Thus there can be no commerce at any time in the open ocean, except that to be made in its western part; but its boundaries are open to all the world, and Englishmen will not be backward in availing themselves of it. One branch alone is American, or scarcely can be called American, as it is only a small section of New Englanders, who so vigorously and exclusively pursue the whale fishery, and bring immense wealth annually to their country. But they were almost exclusively whale hunters in the Atlantic, and seem to have distanced all competitors, even of their own nation. That many new sources of profitable enterprise will be opened there cannot be the slightest doubt, and the present greatly increased and increasing importance of our oriental commerce, of our Australian emigration, and the progress of civilization on the western shores of America imperatively demand that this long required inter-oceanic canal should forthwith exist; and it was considered, that it was especially the province of the Society to discuss the merits of this important question, bearing as it does upon the Arts, Manufactures, and Commerce, of our own country.

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The **Chairman**, in inviting discussion, remarked, that there were some points on which he was not quite clear. It appeared that Col. Lloyd stated that the level of the Pacific was higher than that of the Atlantic. This was contrary to what he should have anticipated; and he thought it possible there might be some mistake, as it had been generally supposed that the level of the sea was uniform. It was at one time thought that the level of the Red Sea was higher than that of the Mediterranean; but on a fuller examination, they were found to be the same. He agreed with Mr. Findlay in his remarks on Mercator's projection, for whilst it was useful to the mariner, he thought that when used for illustrating geographical subjects to the public, it was calculated to mislead.

The Rev. Mr. **Nicolay** said he responded with pleasure to the invitation of the Chairman, although the elaborate paper of Mr. Findlay left but little to be said upon the subject. In all such inquiries it appeared to him that, in this country at least, one great portion of the subject was neglected—being the influence which new routes might exercise on the present exchanges of commerce. He was not aware that any English political or geographical writer had entered at all fully into it. In America the case was different; so it was in Germany. In the former Guyot had in his lectures directed attention to it; and merchants, as Asa Whitney, had made it their study: the Government had, moreover, procured every information available on the subject, and the consequence was, that in their political negotiations with foreign powers it was never forgotten. This had led to the possessions of California and Oregon; to the monopoly of the trade of the Sandwich Islands; and was the cause of the expedition now about to proceed to Japan. To show how it might affect a canal cut through the Isthmus of Panama, he mentioned Mr. Asa Whitney's theory, that the trade of China and Japan must infallibly be monopolized by the inhabitants of the north-west coast of North America; in which case, supposing it true, the canal, if cut, would be for the benefit of the two sea-boards of that continent, and not of Europe. In all inquiries for future paths for commerce,—although direct distance should be considered first, and then the nearest practicable route to the direct line,—the ultimate course of commerce must be determined by the exchanges. He had no doubt it would turn out that the world had been so constructed by its great Creator, that hereafter, when all parts of the world should be in communication, these things would be found in perfect harmony; but at present commercial relations were abnormal, and we must be careful not to attempt to perpetuate such a state of things. He ventured to differ from the Chairman as to the use of Mercator's projection to the mariner. He believed it had led to the abandonment of first principles, and had resulted in a careless and unscientific mode of navigation. The early navigators,—as for instance, Cabot,—directed their courses by spherical calculations; and Davis, the great northern discoverer, had written a work on Great Circle Sailing, which was now esteemed by some of our shipowners a new discovery. Mr. Findlay's calculations with respect to great circle-sailing were fully borne out by some recently made on an extended scale by himself and his friend Mr. G. Smalley; but the results arrived at by Mr. Findlay, as far as they regarded sailing-vessels, differed from those of Mr. Whitney and Captain Synge, both of whom had given great attention to the subject, the former having been engaged all his life in the China and Indian trade, in estimating a gain of 3,360 miles to Western Australia by the Cape route, while Captain Synge shows a similar advantage on the voyage to Australia, amounting to 2,285 miles; he thought that when such authorities differed, it was sufficient evidence that the principles on which their conclusions were based were not sufficiently established. In reference to the route by the Cape of Good Hope to Australia, he expressed his surprise that Kerguelen's Land had not been made a coaling station, or that at least the Steam Companies engaged in the traffic on that route had not examined into the quality of the coal known to exist there; the harbours being excellent. Among the many subjects to which Mr. Findlay had alluded, one was of great importance; viz., the whale fishery of the Pacific, which had been entirely monopolised by the people of the United States, who had above 400 vessels employed in it (Mr. Findlay said 700). He called attention to the importance of the British possessions on the north-west coast of America, especially Vancouver's Island, on account of its coal; and remarked that the trade of that coast, originally opened by Englishmen, had been lost to us, first by the monopoly of the East India Company, and then of the Hudson's Bay Company, and suggested the establishment of whale fishing stations on that coast, in order to stop the demoralization of the natives of the Pacific, consequent on the long absence from home of the men now engaged in that trade; and concluded by expressing his high sense of the value of Mr. Findlay's paper, and of the extent and accuracy of his geographical researches generally.

**Captain Hamond**, as an old navigator of the Pacific, could not allow the opportunity to pass without expressing his sense of the importance of the information and suggestions contained in Mr. Findlay's paper. In reference to the relative advantages of the route by the Cape of Good Hope and by Panama, he thought the increased and increasing requirements of Australian transit, both as regarded those who had already emigrated there, those going, and those about to go, made it necessary not only that they should be taken there in the shortest time, but also with the greatest ease and comfort to themselves. He proceeded to explain the routes by reference to the map, intimating that the smoothest and most pleasant voyages would be obtained by sailing to Australia *viâ* the Cape of Good Hope, and returning to England *viâ* Panama. In regard to new fields of commerce in the Pacific, he thought it was of the utmost importance to give them every attention, as they were increasing in importance every day; and this canal would therefore be of great value. The requirements of our own agriculturists as regarded guano would be benefited by it; and also the trade in copper ore, which now having to be brought round Cape Horn had unparalleled difficulties to contend with. In regard to the currents in the Bay of Panama, he was the first person who brought correspondence from that port to Lima, and he managed it in fifty-two days, thereby effecting a saving of six weeks in the communication of intelligence between England and Lima—a matter of great moment to the merchants at the latter place. He agreed with the preceding speaker as to the importance of Vancouver's Island and our portions of the northern coast of America, and that their resources had not been developed as they would have been by the United States; and referred to California as an illustration, which in 1847 was never called at, except by a solitary whaler in distress. It was now an important state, having cities which had been built and burnt down and rebuilt half a dozen times since their foundation. He had a list of 300 American vessels that had touched at the Sandwich Islands in six weeks.

**Mr. Doull** said, in reference to levels, when the Ordnance Surveys of Ireland were made, the level of low-water was taken as the datum; but when they came over to England, they found, from Liverpool to the Bristol Channel, there was a difference of about thirty or forty feet. This was accounted for by the difference in the lift of the tide, and it became evident that low-water could not be regarded as furnishing a proper datum: the mean of high and low tides was found however to be correct throughout the kingdom. He had no doubt this was the case in the Pacific and Atlantic, and that the difference might be accounted for by the difference in the lift of the tides. In regard to the canal, he thought it was quite clear that they had no data of any service for engineering purposes, and it would be idle to form an estimate with their present meagre information; they could not say whether it would cost 10,000,000*l.* or 15,000,000*l.*, or 4,000,000*l.* or 5,000,000*l.*; and any project in the absence of accurate data must fall to the ground. He believed, however, if the canal were once properly made, it must become, of necessity, one of the noblest highways of commerce. In reading history, every one must have seen that many nations which had been raised by commerce fell by losing it. England was still in the vigour of its youth, yet it was just the time to lay hold of the highways of commerce, of which he might mention two as being of the greatest importance—namely the construction of a line of railway across the North American Continent, colonising as they went along, and opening out the vast fields of mineral wealth known to exist in that territory; and the other, was connecting the Atlantic and Pacific Oceans by a ship canal.

**Mr. Trelawney Saunders** wished to add a remark as to the tides. They were generally now considered as a promulgation of the wave from the south, and were highest on shores exposed to the south wind. At Wicklow there was no tide, whereas opposite, in the Bristol Channel, the tide rose to a height of sixty feet. In regard to this canal benefiting the United States, they knew very well how that country had already dealt with its coasting trade, and how it had affected our Eastern commerce. An American vessel could take a cargo from London to New York, there obtain a second cargo for San Francisco; and by the time she arrived at the latter port she would not only have paid all her expenses, but would have made a profit. She could then go to China, where she would compete with our shipping for a cargo to England; the English vessels having been obliged to take a cargo out there direct, at 3*l.* or 4*l.* per ton, with the expectation of a return cargo at 6*l.* or 7*l.* per ton, but they found that the American vessels were ready and able to do it at 30*s.* per ton. Who, then, could doubt that they would take every advantage of their position to secure the benefits of this canal? He then proceeded to deprecate the traditional course which British commerce was now following, and compared it with the energetic and politic course at present pursued by the American Government, referring to the Japan Expedition as an illustration. The extent and position of the various British dependencies, each offering a nucleus for increasing and improving our commerce, indicated that it was the duty of England to give a new impetus to the commerce of the world, and he trusted it would not fail to do so, but be true to its mission.

The **Chairman** remarked that some time ago the American Government consulted our Government and the Royal Society as to entering into some deep-sea soundings and examinations of the tides. He regretted that it was very coldly received by our Government, and now remained in abeyance. In regard to great circle sailing, he thought much more mystery had been attached to it than was necessary; it was quite clear that the shortest distance between two points on a plane was a straight line, but the shortest distance on a sphere was a great circle. He concluded by proposing a vote of thanks to Mr. Findlay, which was agreed to.

It was announced that at the next meeting, on May 25th, two papers would be read, "On Recent Improvements in Chronometers," by Mr. Loseby, and "On Constructing Glass Balance Springs, and their Application to Time-keepers," by Mr. Wenham.

## THE OFFICE OF SECRETARY.

The claims of the several Candidates for the vacant Secretaryship will be taken into consideration by the Council on June 8th. All applications for the Office must therefore be sent in, on or before Monday the 6th, in writing.

## COMMENCEMENT OF THE TRADE MUSEUM.

The following Correspondence, which has recently passed between the Council of the Society and the Royal Commissioners for the Great Exhibition, will be read with interest by members. The Council hope that the important plan thus commenced, under the joint sanction of the Royal Commissioners and the Society of Arts, will receive from the individual members of the latter that hearty support and aid which, from its great practical utility it well deserves, and which, from their energy and influence, they are so peculiarly able to render it.

Society of Arts, Adelphi, London,
May 7th, 1853.

Sir,—At the Meeting of the Council of the Society of Arts, held on the 13th of April last, the formation of a Trade Museum, as suggested in the Second Report of the Royal Commissioners, was taken into consideration, and it was determined that the Society of Arts should at once undertake to aid in carrying out the plan set forth in the Report.

The Council are of opinion that the Society of Arts can best aid in developing the views of the Royal Commission by commencing the formation of a collection of Animal Produce and Manufactures, as being that element of a General Trade Museum at present virtually altogether unrepresented; at the same time they consider that no opportunity should be neglected which might occur of collecting materials for the other branches of the Museum.

The Council desire in the first instance to ask the approval and co-operation of the Royal Commissioners; and as they feel that notwithstanding the great importance of the object it would not be right for the Society to devote to it so large a portion of their funds as would be requisite, they would propose to set apart the sum of 400*l.*, to be expended in the course of the next two years, provided Her Majesty's Commissioners approve of the proposal, and are willing to devote a similar sum towards the proposed object.

The Council consider that the formation of the collection should be made a special department, altogether independent of the other objects of the Society, and under the control of an officer particularly appointed for the purpose. This important duty they desire to confide to me, and I have already expressed my full willingness to undertake it.

I am therefore instructed by the Council to make this communication to you, and to request that you will bring it before the Royal Commissioners.

I have the honour to be, Sir,
Your very obedient Servant,
(Signed) Edward Solly, *Secretary.*

To the Secretary of the Royal Commissioners.

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Board of Trade, May 10th, 1853.

Sir,—I am directed by Her Majesty's Commissioners for the Exhibition of 1851, to acknowledge the receipt of your letter of the 7th instant, submitting, on behalf of the Council of the Society of Arts, a proposal for commencing the formation of a Collection of Animal Produce and Manufactures, in furtherance of the establishment of a Trade Museum, as suggested in the Second or "Surplus" Report of the Royal Commission; and requesting to be informed how far the Commissioners will be prepared to co-operate with the Society of Arts in promoting that object.

Her Majesty's Commissioners direct me to acquaint you in reply, that they have received this communication from the Society of Arts with great interest and satisfaction, and that they fully approve of the course which the Society proposes to adopt, as shown in your letter; at the same time that it will afford them much pleasure to give every assistance in their power towards carrying out an object having so direct and important a bearing upon the recommendations contained in their Surplus Report.

With reference to the announcement made by you, that the Society has resolved to set apart the sum of 400*l.*, to be expended in the course of the next two years, towards the formation of such a Collection of Animal Produce and Manufactures, provided Her Majesty's Commissioners are willing to devote a similar sum towards the proposed object,—I am to inform you that the Commissioners are prepared to assent to this proposal, and to contribute the above-mentioned sum of 400*l.* in the manner suggested, to be similarly expended in the course of the next two years.

Her Majesty's Commissioners trust that the exertions of the Society of Arts towards the formation, under your superintendence, of the Collection, will be attended with success; and that advantage may at the same time be taken, as mentioned in your letter, of any opportunities that may present themselves for the simultaneous collection of materials for the other branches of the proposed Trade Museum.

I have the honour to be, Sir,
Your most obedient Servant,
(Signed) Edgar A. Bowring.

E. Solly, Esq.,
Society of Arts, Adelphi.

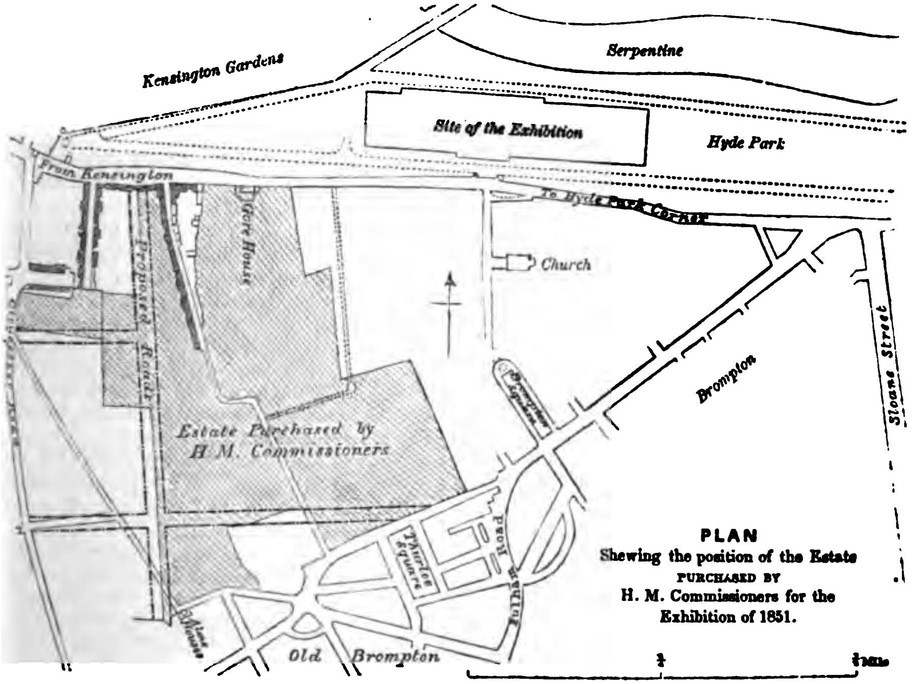
## NOTICE TO INSTITUTIONS.

The Council has much pleasure in announcing that Mr. Babbage has placed at its disposal, for distribution to the Institutions in Union, a limited number of copies of his "Bridgewater Treatise," and also of the Plate of his Analytic Engine, or Calculating Machine. The number being limited, those Institutions desirous of possessing copies of either of these works, are requested to make a special application to the Secretary.

Professor Solly has likewise presented, for a similar object, a number of copies of his pamphlet on Trade Museums, one of which will be sent to each Institution in Union.

## PURCHASE OF GROUND AT KENSINGTON, BY THE COMMISSIONERS OF 1851.

The accompanying Map shows the site and extent of the purchases already made, and which, with some trifling exceptions of property to be hereafter purchased, in order to ensure symmetry of shape, constitute the complete area of the site proposed for various National Buildings. The extent is about eighty-six acres, and the cost of the property has been 280,000*l.*, or an average of 3,250*l.* per acre. This timely and judicious purchase has secured space for National Buildings in the best part of London, and at a price so moderate that even thus early it might be re-sold at a large profit. The effect of the purchase, it is said, has already increased the value of the property in the neighbourhood upwards of forty per cent. The public will shortly have an opportunity of judging for themselves of the beauty of the site, as the grounds of Gore House will be open to all visitors to the Exhibitions about to take place there next week.



**PLAN**
Shewing the position of the Estate
PURCHASED BY
H. M. Commissioners for the
Exhibition of 1851.

## THE SPECIAL PRIZE.

At the Council Meeting on Wednesday last, the 18th inst., the Report of the Judges on the Essays sent in, in competition for the Special Prize offered by the Society, "For the best Essay on the History and Management of Literary, Scientific, and Mechanics' Institutions; and especially how far, and in what manner, they may be developed and combined, so as to promote the well-being and industry of the Country," was read: and the Prize of 50*l.* and the Society's medal was unanimously awarded to the author of the Essay with the motto, "Nemo labori Musas vetet." Mr. James Hole, Honorary Secretary to the Yorkshire Union of Mechanics' Institutes, is the successful competitor.

## CONFERENCE.

Society of Arts, Manufactures, and Commerce,
Adelphi, London, May 11th, 1853.

Sir,—I am directed by the Council to inform you, that a Conference of the Representatives of the Institutions in Union is to be held at this house on Thursday, June 9th, at 11 o'clock, A.M., precisely.

I am also enabled to inform you that the Lord Mayor, who purposes to hold at the Mansion House a Conversazione of the friends of Education on the previous evening—namely, Wednesday, June 8th—having especial reference to the introduction of a more general and practical cultivation of science and art as branches of general instruction, has been pleased to intimate to the Council that it is his intention to send cards of invitation for that occasion to each of the Representatives of the Institutions in Union, who may be appointed to attend the Conference.

It is also proposed, that on June 9th, after the Conference, the Representatives of the Institutions, the Members of the Society of Arts, and some other Friends of Education, should dine together, at 6 o'clock, P.M., at the Freemasons' Tavern. The arrangements for that dinner will be similar to those of May 18th last year.

I am directed to request you to communicate to me, at your *earliest* convenience, the name and address of the Representative whom your Institution may appoint to attend the Conference: his name will then be made known to the Lord Mayor. I shall be obliged by your also stating whether the Representative will attend the dinner on June 9th. The price of the dinner-ticket will be 7*s.* 6*d.* without wine.

The Council will be glad if your Institution would suggest any subjects which they deem most important to be discussed at the approaching Conference.

I am, Sir, your obedient servant,
EDWARD SOLLY, Secretary.

## UNIVERSAL EXHIBITION OF AGRICULTURAL AND INDUSTRIAL PRODUCTS AT PARIS IN 1855.

The Lords of the Committee of Privy Council for Trade have received a communication from the Secretary of State for Foreign Affairs, transmitting a copy of a letter from Count Walewski, the French ambassador at the Court of London, in which it is announced that by a decree of March 8th last, His Majesty the Emperor has ordered that a Universal Exhibition of Agricultural and Industrial Products shall take place in Paris on May 1st, 1855.

The French Ambassador states that exhibitors of those countries who answer to this appeal will meet with every requisite facility, both as regards the Customs regulations, and the reception, arrangement, and security of their products in the Palace of Industry. A later decree, which will be communicated without delay, will determine and specify the conditions of the Universal Exhibition, the rules under which goods will be exhibited, and the different kinds of products which will be admitted. Count Walewski expresses a hope, on behalf of the Government of His Imperial Majesty, that the British Government will do all in their power to direct the attention of British manufacturers to the intended Exhibition of 1855, and that they will answer to the invitation which is now addressed to them, with the same ardour as the French manufacturers responded to the invitation of England in 1851.

In accordance with the request of the Earl of Clarendon, my Lords desire to give the widest publicity to this measure, in order that no effort may be spared in furtherance of the intentions of the Emperor of the French as regards the Exhibition of British Agriculture and Industry.

HENRY COLE, } *Joint Secretaries.*
LYON PLAYFAIR, }
Marlborough House, May 10th, 1853.

## PROPOSED NEW MERCANTILE AND MARITIME COLLEGE FOR LONDON.

A public meeting was held on Tuesday last at the London Tavern, to consider the desirableness and best means of establishing a mercantile and maritime college. In the absence of the Lord Mayor from indisposition, the Earl of **HARROWBY** was called to the chair. The meeting was fully attended. Letters were read from Mr. Hume, M.P., Baron Rothschild, Mr. J. W. Gilbart, &c., regretting their inability to attend the meeting, but expressing sympathy in its object.

Mr. **ANDERSON** read a report of the proceedings of a Committee which had been formed to carry out the establishment of a Mercantile and Maritime College, of which the following is the substance:—It stated "that much interest had been long felt among the mercantile classes in the reform of our commercial laws, and a spirit of inquiry into the principles which govern commercial law awakened; and a great want had been felt of an institution where the knowledge of these and other branches of education might be within the reach of the classes whose interests were affected. Referring to the growth of our mercantile marine, it was urged, that its success depended on the intelligence and moral character of those in whose charge it was placed, and that competition with other countries rendered it necessary to raise the standard of information, the tone, and habits of seafaring men. In connection with this, the necessity of a trade museum was urged; the formation of which was suggested to the merchants of the City of London by the Commissioners of the Great Exhibition, and which should contain specimens and samples, and the means of acquiring statistical and commercial information. It stated that no comprehensive library of reference on the subjects of commerce, banking, &c., now existed in the City of London; and that that want ought to be supplied. Those were the causes which prompted a few individuals to form themselves into a committee, to consider in what manner the establishment of a mercantile and maritime college could be accomplished; and with this view they had prepared a statement which had been widely circulated, and the object in question was found to be one universally desirable and worthy of support. Before founding a new institution, attention had been directed to Gresham College, which was now in existence, and it was thought desirable to consider how far the trustees would be induced to enlarge its operations. That was the object of this meeting. Gresham College was once the seat of learning and the liberal arts, and the cradle of the Royal Society, which originally had there a library of 2,000 volumes, besides a repository of instruments, books, &c., but which had long been transferred to another place. The college had at length been levelled to the ground by the authority of an act of the legislature, in consideration of the payment of a ground-rent of 500*l.* a year, the trustees contributing 1,800*l.* to the demolition. Another small building had been since erected in Gresham street, where occasional lectures were delivered. It was hoped that the result of this meeting would be the formation of an institution worthy of the City of London and of Sir Thomas Gresham, and placed under such management as was thought best for the promotion of its objects. The Government had obtained a site in the centre of the City at a small ground-rent, and it was thought that was a claim for its liberal assistance towards the foundation and support of an institution intended to raise the standard of education among the officers of our mercantile marine. It was hoped that the enlightened part of the Common Council and the Mercers' Company would be induced to appoint a committee of inquiry into the whole matter, and see how they could best co-operate for the attainment of the object in view."

The following Resolutions were unanimously agreed to:

1st.—"That the importance of the City of London as the focus of the mercantile interests of the empire, and the nursery of the largest mercantile marine in the world, demands that it should possess among its other institutions a Mercantile and Maritime College, which may supply sound and extensive information on all branches of practical science, and afford the means of acquiring a knowledge of the principles which govern the various relations of commerce."

2nd.—"That such a college should also possess a trade museum, to contain samples of produce and manufactures, charts and models, a repository of statistical, general, mercantile, and legal information from all countries, and a commercial, banking, and scientific library."

3rd.—"That a Committee be formed for carrying out the above objects, to consist of the Earl of Harrowby, Baron Rothschild, M.P., Messrs. Thomson Hankey, F. Russell, M.P., B. Oliveira, M.P., A. Gillespie, J. Dillon, J. W. Gilbart, F. Bennoch, W. Crawford, S. Morley, H. A. Matheson, J. G. Hubbard, W. Hawes, Alderman Wire, &c., &c."

4th.—"That the Committee be recommended to take into consideration how far Gresham College, or any other similar institution in the City, may, by a proper adaptation to the requirements of the present time, serve as the basis of the Mercantile and Marine College."

## TREATMENT OF FOREIGN WINES.

At a recent weekly evening meeting of the Royal Institution, Mr. Brockedon, F.R.S., gave the following interesting particulars relative to the Treatment of Foreign Wines.

"The wine when pressed is not vatted in large quantities, but placed in casks which have been sulphured, to check fermentation and preserve its sweetness as far as possible. During the winter following the vintage, it is racked two or three times, and in the following spring, about March, the bottling commences.

"In order to obtain the wine with perfect brightness, into each bottle is put a wine-glass full of *liqueur*, which is prepared by dissolving fine candied sugar in wine till it becomes a rich syrup. If the wine is to be made pink, a red wine is used; if pale, white wine. This liquor produces a fresh fermentation in the bottle, by converting the sugar into alcohol and carbonic acid gas. Every bottle on being filled and corked is laid on its side on a frame having holes made through it, into which the neck of the bottle is inserted. As the fermentation advances, every bottle in succession is dexterously shaken gently on its axis every day, to prevent any adhesive deposit on the side of the bottle; and each day it is lifted more and more upright in the frame until the foul portion rests only in the downward neck of the bottle. It is then ready for *dégorgement*, a process by which the foul deposit is removed. The bottle is carefully held in such a position, that when the string which holds the cork is cut, the deposit is blown out by the force of the gas within. The foul matter only is allowed to escape by the skilful use of the fore-finger of the operator, which stops the flow until the effervescence subsides under its pressure. He then quickly and dexterously fills up the bottle from the contents of another already purified. It is then passed with great rapidity under a machine, by which a large cork is forced into the bottle, and is then as rapidly tied. It is afterwards wired and stacked away in vast and cool caves, some of which, thousands of yards in extent, have been excavated in the solid chalk of the hill side. These stacks of bottled Champagne are so ingeniously made, that though they may each contain from 1,000 to 10,000 bottles, any one of them can be withdrawn for examination. In a warm spring, the extent of bursting in these bottles is a cause of great loss. In April, 1843, Madame Cliquôt, of Rheims, lost 400,000 out of her stock for that season of 1,600,000 bottles. Further destruction was checked by obtaining from Paris ten or twelve waggon-loads of ice, which, strewn in the caves, lowered their temperature.

"When the wine is thus stacked, the merchants visit the caves to buy, and it is scarcely recommended to their notice, unless the breakage can be shown to be not less than ten per cent. It is this loss, and the cost of labour in preparing, that enhances so much the value of the wine of Champagne.

"The condition of the wine in the bottle can be easily ascertained by a simple means. A fine hollow needle can be thrust through the cork, and a taste obtained from the pressure within, through the tube. On withdrawing the circular needle, the elasticity of the cork closes the puncture."

## HOME CORRESPONDENCE.

### SELF-SUPPORTING EDUCATION.

Sir,—Since reading my paper on the 27th of April last, my attention has been called to the British and Foreign Schools in Abbey-street, Spitalfields, as an instance of schools assuming a self-supporting character (so far as regards the annual expenses) in a very poor district. The schools, built for 1000 children, are for boys, girls, and infants; the school-rooms, class-rooms, playgrounds, all good and extensive, are well-fitted for their purposes. There is a Lending Library for the parents, to which they pay, as well as the children; and also a Benefit Society belonging to the Institution.

The payments for schooling are 2*d.* per week for each child in the infant schools, and lowest class in the other schools; 3*d.* for the class next above; 4*d.* for the next, and 6*d.* per week for the highest class; and these school payments now amount to 500*l.* per annum, or upwards.

The school is in connection with the Committee of Council on Education, and has a number of pupil teachers in both schools; but independent of them, it is the opinion of the master that they might be perfectly self-supporting.

The children purchase their own writing-books; the reading-books (the British and Foreign, and those of the Irish Board) are the property of the school; but it would clearly be a great advantage were the children to purchase them; and in carrying out this the master anticipated little or no difficulty. He has had the boys' schools from the first, and is perfectly aware of the importance of making this class of schools, as far as possible, self-supporting; and some years ago visited Kings Somborne, to see the working of the schools there.

I examined the boys in one class-room (the highest class) about eighty in number; they showed an amount of intelligence it was most pleasing to witness; but what particularly pleased me was the healthy aspect, the cleanliness, and moral tone of the school throughout. Their self-supporting character gives a value to them, as an example, which is very important. The same amount of schooling, if gratuitous, would have been of comparatively little value.

I am, Sir, yours truly,
R. Dawes.

## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Institution of Civil Engineers, May 17, 1853. Joseph Locke, Esq., M.P., Vice-President, in the Chair. The first paper read was "On the Caloric Engine," by Mr. C. Manby, M. Inst C.E. (Secretary). At meetings of the "Société d'Encouragement pour l'Industrie Nationale," on the 26th January, 1852, and of the "Académie des Sciences," on the 2nd February of the same year, Mons. Galy-Cazalat entered upon an examination of the principles of Ericsson's Caloric Engine, assuming it to be composed of parts analogous to a non-condensing steam-engine. After describing these component parts and their several uses and relative bearings, he gave a quotation from Ericsson's English Patent of December 26th, 1850, stating that it would have led to the idea of a perpetual motion, but that the well-known law governing the elastic force of gases at various temperatures, demonstrated the erroneous principle on which the presumed economy of the caloric engine was based. It was contended, that if the degree of elastic force of a gas was directly proportioned to the amount of caloric combined with it, a certain mechanical power must be exerted, to abstract that caloric from the gas, and no filter could retain any portion, without opposing such a degree of resistance as would destroy the economy.

The next paper read was, "On the Principle of the

Caloric, or Hot Air Engine," by Mr. J. Leslie, M. Inst. C.E. The main objects of the author were to show, that the "Regenerator," or, as he contended it should be called, the "Economizer," was based on the correct principle of the rapid equalisation of temperature of two bodies of unequal temperatures when brought into contact, and that it was practically productive of economy of fuel; that the date of the production of Stirling's Air Engine was antecedent to that of Ericsson; and that the former was decidedly superior to the latter in the general arrangement, in the details of construction, and in the general efficiency. The apparatus called, "Jeffrey's Respirator," was instanced, as an analogous application of the alternate heating and cooling of air, in its passage between metallic surfaces.

The last paper read was, "On the Conversion of Heat into Mechanical Effect," by Mr. C. W. Siemens. In the first section of the paper, the abandonment of the prevailing theory that heat was material (though imponderable) was insisted upon, and it was shown to be untenable by Sir Humphrey Davy's experiment of melting two pieces of ice by friction against each other; by the experiment of Dulong, proving, that although heat was absorbed in the expansion of gases, the specific heat of the gas was not thereby increased; and by the experiment of Joule, of Manchester, who produced heat in several ways by mechanical effort only. The "dynamical theory" was supported by proofs derived from French, German, and English authors of the present day. It was explained, that according to that theory, heat was vibratory motion of the material particles of either solid, liquid, or gaseous substances. In the gases, this motion was so great that it completely destroyed cohesion between the particles, on which account they were better adapted to the production of mechanical effects by heat than either liquids or solids. In the second part of the paper, the practical and theoretical conditions of air engines were examined, and were illustrated by diagrams. The result arrived at in this examination of the general case of an air engine, consisting of an air pump, a heated reservoir, and a working cylinder, into which the heated air was admitted for such a portion of the stroke, as to obtain the maximum expansive action, was, that "theoretically it was not superior, and practically it was much inferior, to an ordinary condensing steam engine." In conclusion, the author referred to his own experiments and practical experience of several years, and enumerated the necessary characteristics of a machine, which, in his opinion, would constitute the most perfect engine, and with different applications of the respirator (or regenerator). The President's Conversazione was announced to be held on Tuesday, May 31st, and members were requested to co-operate in sending models, &c., for exhibition.

## PROCEEDINGS OF INSTITUTIONS.

DARLINGTON.—The members of the Mechanics' Institution having long felt the want of suitable premises in which fully to carry out their objects, have taken steps for the erection of a capacious building, and already raised upwards of 1,100*l.* towards defraying the cost, (estimated at upwards of 2,000*l.*); 700*l.* of this sum being munificently subscribed by *two* ladies,—Miss Pease, of Feethams, contributing 400*l.*, and Mrs. Barclay, 300*l.* On Thursday, the 12th inst., the foundation-stone of this building was laid amidst much rejoicing. The site has been purchased of the Earl of Beverley, and is situated in Skinner-gate. The building will contain a lecture-hall, 52 feet by 24 feet, capable of holding 600 persons, with gallery, and prepared for side galleries if required; a reading-room, on the ground-floor, 28 feet by 22 feet; a library, 18 feet by 16 feet; a committee-room, 24 feet by 13 feet; class-rooms, 18 feet by 12 feet; and accommodation for an attendant to reside on the premises. The architect is Mr. Joseph Sparks, of Darlington. The lecture-hall is for the joint use, under certain regulations, of the Mechanics' Institution, and of the Temperance Society. A few days since the foundation stone was laid with much ceremony, and the members of both bodies mustered strongly on the occasion.

SHERBORNE.—The course of Lectures at the Literary Institution was brought to a conclusion on Friday last, May 13th, when the President for the year, the Rev. W. H. Turner, ably treated on "The History and the Schools of Painting." Twelve Lectures have been delivered during the session—namely, Mrs. Balfour, on "The Moral and Intellectual Influence of Woman on Society;" Mr. Groves, of Wareham, on "The Geology of Dorset;" the Rev. J. H. Davies, on "The Peninsular War, elucidating the Character of the Duke of Wellington;" Mr. Chatterton, on "The History of the Harp;" Mr. Elihu Burritt, on "Ocean Penny Postage;" Mr. Cowden Clarke, on "Ancient Ballads;" the Hon. and Rev. S. G. Osborne, on "Man Amongst us;" Professor Gardner, on "The Chemistry of the Breakfast Table;" G. Wightwick, Esq., on "Architecture generally considered;" H. D. Seymour, Esq., M.P., on "The British Empire in India;" W. H. Williams, Esq., M.D., on "The Chemistry of the Atmosphere;" and that by the Rev. W. H. Turner, as above. Seven of these were gratuitous. The receipts during the year ending March 25th were 81*l.* 14*s.* 4*d.*, and the expenditure, 60*l.* 10*s.* 8*d.*; leaving a balance in hand of 21*l.* 3*s.* 8*d.*

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

## MISCELLANEA.

ROYAL GEOGRAPHICAL SOCIETY.—The Anniversary Meeting of this Society will take place on Monday, the 23rd inst., for the election of Officers, at one o'clock, P.M. After the reading of the Council Report, the President, Sir Roderick J. Murchison, will present the *Founder's* Gold Medal to Mr. Francis Galton, for his extensive explorations in Southern Africa; and the *Patron's* Gold Medal to Commander E. A. Inglefield, R.N., for his late researches in the Arctic Regions. The President will next deliver the annual address, on the "Progress of Geographical Science and Discovery during the past year." The Anniversary Dinner will be held at Willis's Rooms, at seven o'clock, P.M.

**Duty on Paper.**—In a pamphlet by Mr. J. B. Crompton, the celebrated paper-maker, of Farnworth Mills, near Bolton, the following remarks occur:—"It is therefore to the repeal of this duty that attention is now particularly directed, on several grounds, each of which is entitled to serious consideration as being for public advantage. The most important feature of this question is, the immense impetus which would be given to the employment of labour. It has already been shown that the partial reduction of duty almost doubled the amount of production; and it is but reasonable to suppose that the repeal of the remaining 1½*d.* per lb., added to the total removal of all Excise restrictions, would stimulate consumption by reduced cost in a still greater ratio. This of itself would bring into demand a largely increased amount of labour in the manufacture of the article, not only of men, but also of women and children, for whom employment is not generally to be found, particularly in rural districts, where paper-mills are commonly situated; but this is by no means the extent of the benefit which a repeal of this tax would afford, for there is no description of manufacture which, in its subsequent processes of adaptation for the uses of man, affords so much and such varied employment as that of paper. Indeed, it is impossible to give even a faint idea of the thousand ways in which both manual and mental labour is engaged upon the raw material of paper, and any estimate of the additional amount of native industry, which an abolition of this duty would call into exercise, would be deemed almost incredible. Upon a daily newspaper, consuming annually 3,000*l.* value in paper, there is employment given to the extent of 15,000*l.* a year; and when to the increase of labour from this source alone which would arise from the abolition of the duty, there is added the large number of publications which would be called into being solely through the reduced price of the paper, which forms so material an item in the expenditure, the advantage in this respect would be enormous. It has been computed that the repeal of the paper duty would give employment to 40,000 additional people in London alone, besides a vast number in the country; and to these may be added a considerable increase in the various other persons employed in the business of printing and publishing, including folders, stitchers, bookbinders, &c.; and comprising children and adults of both sexes. There are also numerous manufactures, such as millboard, cardboard, papier-maché, buttons, ornaments, toys, &c., in which paper forms the principal ingredient, and to these a still greater stimulus would be given by the reduced cost of production adding immensely to the employment of every description of labour. If the consumption of paper be traced through its various ramifications, and the number of people be taken into consideration who are employed upon it in other countries, where the manufacture is not subject to duty, it is almost impossible to conceive the vast amount of labour which would be created by its application to uses from which it is now only debarred by the duty, so that the relief from this tax would materially augment the national resources, and, in this point of view, produce a greater amount of practical and positive good than any other scheme which could by possibility be devised." * *

"The raw material from which paper is manufactured is now being purchased by foreigners for exportation, to be manufactured in countries where no tax exists, and the paper produced therefrom superseding, in our own colonies and other countries, British paper. The consequence is, that large quantities of the raw materials are shipped to the United States; and this not only advances the price here, but takes away the labour upon the same, which would otherwise be performed in England." * * * * * *

"There is yet another benefit which would arise from the repeal of the paper duty. It has been shown by the most experienced and extensive publishers, that the duty on paper is the sole bar to the issue of publications of an instructive character, at so low a price as to bring them within the reach of the million; and many of them, after having attained a very extensive circulation, were compelled to be discontinued, owing solely to the heavy losses which the paper duty inflicted upon the proprietors. The want of such works is severely felt in densely-populated districts, where the temptations to profligacy, immorality, and drunkenness, are irresistible to the uneducated, unless their thoughts are diverted from sensual indulgence to the innocent enjoyments which might be afforded by reading, but to obtain which cheapness is indispensable."

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 12th May*, 1853.
210(1). Chatham Election—Index to Minutes of Evidence.
428. Totnes Election—Report from the Committee.
438. Legacy, &c., Duties—Return.
443. Chapters—Return.
444. Ship *Rattlesnake*—Copies of Instructions.
471. Lyme Regis Borough—Correspondence.
464. Bills—Hackney Carriages (Metropolis), amended.
465 ,, —Taxing Officers, Common Law Business (Ireland), amended.
466. ,, —Expenses of Elections.

*Delivered on 13th May.*

191. Local Acts—Reports of the Admiralty.
459. Probate Duty—Return.
460. Customs—Return.
469. Dowie's Patent Boots—Correspondence.
226. Ionian Islands—Return.
473. Bill—Convicted Prisoners' Removal and Confinement.
Criminal Offenders (England and Wales)—Tables.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette*, 13*th May*, 1853.

*Dated 28th April.*

1031. J. Berry and T. Booth—Machinery for printing woven fabrics and paper.
1033. W. H. Sitwell—Projectiles.
1035. W. A. Gilbee—Apparatus for heating. (A communication.)

*Dated 29th April.*

1037. G. T. Day—Travelling packages.
1038. T. Pennell—Revolving fire-arms.
1039. C. A. Joubert and J. C Kohler—Busks for stays.
1040. R. Davison and J. C. Horrocks—Conveying and separating granular substances.
1041. T. C. Banfield—Machinery for chopping roots, &c. (A communication.)
1042. T. C. Banfield—Drying and preserving vegetable or other saccharine plants. (A communication.)
1043. J. S. Vigoureux—Combing wool, &c.
1044. J. Macpherson—Looms.
1045. C. Mather—Bleaching apparatus.
1046. H. Witthaff—Filters. (A communication.)
1047. O. P. Drake—Apparatus for vapourising and burning benzole, &c.
1048. J. Kealy—Mowing machinery.
1049. J. Bristow and H. Attwood—Consuming smoke.

*Dated 30th April.*

1050. C. Adams—Valve for cisterns and float-valve.
1051. B. Barrett—Treatment of natural or artificial stone for hardening and colouring same.
1052. J. Smith—Machine for cutting chaff, &c.
1053. W. Grimshaw—Slubbing and roving frames.

*Dated 2nd May.*

1054. J. and W. and T. Balmforth—Steam-hammer.
1055. J. Smith—Flooring-cramp and lifting-jack.
1057. H. C. Jennings—Manufacture of soap.
1058. J. F. Kingston—Reaping and mowing machinery.
1059. E. Heywood—Regulating throttle-valves of steam-engines.
1060. J. Reeves—Machinery for crushing ores, &c.
1061. G. Murton and W. H. Langshawe—Stretching, dressing, &c., cotton, &c.
1062. A. E. L. Bellford—Manufacture of sugar. (A communication.)
1063. D. Reading—Bearings for axles, &c.
1064. F. Monfrant—Lubricating materials.
1065. A. E. L. Bellford—Sawing-machines, &c. (A communication.)
1066. A. M. C. C. Faure—Manufacture of geographic and other maps.
1067. C. Radunsky—Electro-voltaic apparatus. (A communication.)
1068. M. Newton—Carriages, and prevention of their overturning. (A communication )
1069. J. T. Wood—Boxes hitherto made of pasteboard.
1070. H, Mane—Steam-engines.

*Dated 3rd May.*

1071. T. Claridge—Cutting or shearing metals.
1072. G. T. Holmes—Threshing machines.
1073. R. W. Swinburne—Manufacture of glass.
1074. G. F. Goble—Locks.
1075. R. Quin—Cases for jewellery, &c.
1076. S. V. Bonneterre—Machinery for manufacture of screws.
1077. E. T. Bainbridge—Motive power.
1078. L. Cornides—Treatment of ores.
1079. T. and J. Chambers—Kitchen sinks.
1080. F. Arnold—Binding books.
1081. W. E. Newton—Hot air furnaces, &c. (A communication.)
1082. F. Lipscombe—Propelling.
1083. W. E. Newton—Machinery for dressing millstones. (A communication.)

*Dated 4th May.*

1084. G. Bell—Machine for several agricultural purposes.

APPLICATIONS WITH COMPLETE SPECIFICATIONS FILED.

1101. W. Buckwell—Construct of buildings. May 5th, 1853.
1102. C. Larbaud—New trigger pistols, &c. May 5th, 1853.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 12th May, 1853.*

727. John Henry Johnson, of 47, Lincoln's Inn-fields and Glasgow—Improvements in measuring and registering the flow of fluids. (A communication.)
735. Robert Lucas, of 3, Furnival's-inn—Invention of improved machinery to be used in the preparation of cotton and other fibrous materials for spinning. (A communication.)

*Sealed 13th May.*

748. Constant Jouffroy Duméry, of Paris—Improvements in the manufacture of metallic pipes and tubes, and in the machinery employed therein.
750. John Mirand, of Paris, and 16, Castle-street, Holborn—Improvements in the construction of electric apparatus for transmitting intelligence.
773. Henry Russell, of Norwich—Improvements in pianofortes.

*Sealed 16th May.*

769. Francois Vallée, of Bruxelles—Improvements in preparing, spinning, and doubling flax, cotton, wool, silk, and other fibrous materials.

*Sealed 17th May.*

817. James Hume, of Birkenhead—Improvements in water-closets.
841. Peter Armande le Comte de Fontaine Moreau, of 4, South-street, Finsbury, and 39, Rue d'Echiquier, Paris—Improvements in machinery for manfacturing fishing and other nets. (A communication.)
846. Joseph Henri Combres, of 14, Rue des Prêtres, Paris—Invention for preventing the ill effects of dampness in walls and dwellings. (A communication.)
848. Charles Finlayson, of Manchester—Improvements in apparatus for heating, drying, and ventilating.
855. Robert Mortimer Glover, M.D., of Newcastle-on-Tyne—Improvements in coating the bottoms and other parts of ships and vessels, in order to prevent animal and vegetable growth in contact therewith.
858. John Tatham and David Cheetham, of Rochdale—Improvements in machinery or apparatus for preparing, spinning, and doubling cotton and other fibrous substances.
869. Adam Ogden, of Huddersfield, and John Ogden, of Hey Chapel, Ashton-under-Lyne—Improvements in machinery for spinning cotton or wool.
870. James Ward Hoby and John Kinneburgh, of Renfrew—Improvements in the manufacture of metal castings.
887. Thomas Wood, of the Glue Works, Hunslet, Leeds—Improvements in the mode of obtaining motive power.
942. Peter Walker, and Andrew Barclay Walker, of King-street, Warrington—Improvements in fermenting ale and porter, and other liquids.
961. Joseph Cliff, of Wortley, Leeds—Improvements in the mode of making and compressing bricks, lumps, tiles, quarries, terra cotta, and other similar articles.
988. Samuel Aspinwall Goddard, of Birmingham—Improvements in the construction of pistols.
993. Peter Armande le Comte de Fontaine Moreau, of 4, South-street, Finsbury, and 39, Rue de l'Echiquier, Paris—Improvements in machinery for applying metallic capsules. (A communication.)
1072. Peter Armande le Comte de Fontaine Moreau, of 4, South-street, Finsbury, and 39, Rue de l'Echiquier, Paris—Invention of an improved lamp, which I call "lamp omnibus." (A communication.)
1111. William Wilkinson, of Nottingham—Improvements in the manufacture of paper and pasteboard, and in the production of a substance applicable for veneers, panels, and to many purposes to which gutta percha and papier maché are applicable.
1. William Wilkinson, of Nottingham—Improvements in taps and other apparatus for filtering and drawing off liquids.
60. Richard Walker, of Birmingham—Improvements in the manufacture of buttons.
330. William Romaine, of Sackville-street, Piccadilly—Improvements in rendering wood more durable and uninflammable.
404. Joseph Skertchley, of Kingsland, and Austy, Leicester—Improvements in copying-presses.
412. William Bridges Adams, of Adam-street, Adelphi—Improvements in railways.
510. William Edward Newton, of 66, Chancery-lane—Improvements in capstans. (A communication.)
568. Godfrey Simon, and Thomas Humphreys, of Pennsylvania, America—Improvements in carriages.
630. Robert Christopher Witty, of 1, Portland-place, Wandsworth-road—Improvements in the manufacture of gas.
643. Thornton John Herapath, of Bristol—Improvements in treating sewage, and in manufacturing manure therefrom.
654. Samuel Colt, of Spring-gardens—Invention of improved apparatus for heating and annealing metals.
659. William Blinkhorn, of Sutton, Lancashire—Improvements in the construction of furnaces and annealing kilns employed in the manufacture of glass.
660. George Johnson, of Stockport—Improvements in looms for weaving.
666. William King Westly, of Leeds—Invention of an improved comb or gill for heckling, drawing, roving, and otherwise preparing to be spun, hemp, flax, tow, silk wool, and other fibrous materials.
677. George Ross, of Hatton-garden—Invention of an improved manufacture of lubricating oil, and a mode or modes of applying such oil to the purposes of lubrication. (A communication.)
685. Samuel Radcliffe, and Knight William Whitehead, of Oldham—Improvements in machinery or apparatus for grinding or setting the surfaces of cylinders and rollers employed in carding engines.
686. Alfred Vincent Newton, of 66, Chancery-lane—Invention of an improved construction of oil lamp. (A communication.)
690. Moses Poole, of Avenue-road, Regent's-park—Improvements in generating steam and other vapours. (A communication.)
691. Jean Marie Durnerin, of 11, Rue de la Monnaie, Paris—Improvements in apparatus for extracting liquid out of solid substances, specially applicable to the treatment of fatty matters.
692. Moses Poole, of Avenue-road, Regent's-park—Improvements in obtaining power where air is employed. (A communication.)
693. Isaac Taylor, of Stanford-rivers, Essex—Improvements in machinery for printing woven and other fabrics.
701. William Johnson, of 47, Lincoln's Inn-fields and Glasgow—Improvements in rolling and shaping malleab metal. (A communication.)
703. Frederick Futvoye, of Regent-street—Improved apparatus to be employed in games of chance.
714. William Prior Sharp, of Manchester—Improvements in machinery for spinning and doubling cotton and oth fibrous materials.
736. Augustin Chrysostome Bernard, and Jacques Marie Pierr Alberic, of Paris, and 4, South-street, Finsbury—Invention of an improved mode of giving publicity
739. Samuel Fox, of Stockbridge Works, Deepcar, near Sheffield—Improvements in the frames of umbrel and parasols.
762. James Bowron, of the Tyne and Tees Glass-works, Sout Shields—Improvements in the manufacture of crow sheet, plate, and bottle glass.
784. Robert Dalglish, of Glasgow—Improvements in dyeing

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| May 17 | 3459 | Improved Flap and Drain-mouth for Sewers | Humphreys and Thirst | Halsey-street, Chelsea. |
| " 18 | 3460 | Vertical Tubular "Fire-box" Boiler | John Mackay | The Iron-works, Drogheda |

# SOCIETY OF ARTS.

FRIDAY, MAY 27th, 1853.

## TWENTY-SECOND ORDINARY MEETING,

### *Wednesday, May 25th,* 1853.

The Twenty-second Ordinary Meeting of the Society was held on Wednesday, the 25th instant, Thomas Winkworth, Esq., in the chair.

The following were elected Members:

Eales, William, Sheffield-terrace, Kensington.
Levy, Moses, 26, Upper Harley-street.
Power, David, The Cloisters, Temple.
Richards, Theophilus, Birmingham.
Simmons, Capt. J. L. A., R.E., Board of Trade.
Vaughan, Charles John, D.D., Harrow.
Vaughan, David James, M.A., Trinity College, Cambridge.
Ward, the Rt. Hon. the Lord, Dudley House, Park-lane.
Wylde, R. G., 11, Eaton-place South.
Ysasi, Don Manuel de, Club Chambers, 15, Regent-street.

and the names of five Candidates for Membership were read.

The following Institutions have been taken into Union:

266. Hertford, Mutual Instruction Society.
267. Liverpool Collegiate Institution.

The Secretary announced that the Council had determined that the Annual Meeting for the distribution of the Prizes that had been adjudged during the past Session, should be held on Friday, June 10th, at half-past four o'clock, P.M. precisely; and that His Royal Highness the Prince Albert, the President, had graciously expressed his willingness to preside on that occasion.

The Secretary also drew the attention of the members to a magnificent series of volumes, relating to the Great Exhibition of 1851, recently presented to the Society by the Royal Commissioners; and read the following letter which accompanied them, from the Secretary of the Commission:

Board of Trade, May, 1853.

SIR,—I am directed, by her Majesty's Commissioners for the Exhibition of 1851, to transmit herewith a complete set of the various works, illustrative of the Exhibition, that have been prepared by their orders for the purpose of presentation to Foreign Governments, &c. The set in question comprises the following series of volumes, nine in number:—"Jury Reports, Illustrated with Photographs of Articles Exhibited," 4 vols.; "First and Second Reports of the Commissioners," 1 vol.; "Illustrated Catalogue," 3 vols.; "Medals struck by Order of the Commissioners," 1 vol.; and her Majesty's Commissioners direct me to request the Council of the Society of Arts to accept this present at their hands on behalf of the Society.

The Commissioners are desirous of availing themselves of this opportunity of expressing the high sense entertained by them of the very valuable assistance which they have received, through the whole course of their labours, from the Society of Arts. They feel that that Society, by means of the early Exhibitions instituted by it, first showed the possibility of the successful realisation of the great International Exhibition of 1851; whilst the benefit of its co-operation has at all times been freely given by it to the Commissioners from the date of the issue of the Royal Commission. It was by members of the Society of Arts, again, that a large proportion of the most zealous and efficient services rendered to them by *individuals* was afforded; and a further proof of the sympathy of the Society is to be seen in the institution by it of the interesting series of Lectures on the results of the Exhibition, which have lately come to a close.

It therefore affords her Majesty's Commissioners much pleasure to have it in their power to record, in a permanent manner, by means of the slight tokens that accompany this letter, their appreciation of the cordial co-operation of the Society of Arts, Manufactures, and Commerce, towards bringing the Exhibition to its successful issue. I have the honour to be, Sir,

Your most obedient servant,
EDGAR A. BOWRING.

E. Solly, Esq., Society of Arts,
John-street, Adelphi.

A paper was then read, "On Recent Improvements in Chronometers," by Mr. Loseby.

The paper commenced with a general description of the different parts of a chronometer, divided into the train, the escapement, and the balance, with its spring; and after giving various reasons to show the small advantage that could be derived from perfection of form in the train wheel teeth, it proceeded:

We now arrive at the escapement, and here the first material difference between one kind of watch and another presents itself.

The chronometer escapement was then described with the aid of large drawings, and the various points noticed which constitute its great superiority over all other balance escapements, and Mr. Loseby proceeded:

It is a general opinion that the chronometer escapement is more subject to injury than the lever, and some other of the common escapements; so far, however, as concerns its liability to accident in actual use, I believe this opinion to be erroneous; for I have never known an instance where the detent has been broken in use, and the balance staff and other portions are quite as easily injured in the lever escapement as they are in the chronometer.

The various adjustments necessary in chronometers were then enumerated, which were styled the *mental* workmanship, to distinguish it from the mechanical; as the most practised eye could not discover whether they had been made or not, and hence the great difference in value which may exist between one chronometer and another. After describing the isochronous adjustment for change of arc and the adjustment for positions, the paper proceeded:

The second adjustment refers to the compensation for change of temperature; and this brings us to that part of the subject to which it is my intention in this paper more particularly to allude, from its being the only portion of the chronometer in which any well-established improvement has been made within the last half century; all the finest chronometers being constructed, with this exception, precisely as they were fifty years ago.

The ordinary compensation balance was then described with the aid of diagrams, and the method of adjusting it, and Mr. Loseby then proceeded:

In speaking of the finest chronometers, those having the ordinary balance cannot now be included, as their errors, when most perfectly adjusted, are still sufficiently large to be seen without very long trials, on account of what is generally called the supplemental error. This cannot be corrected by the ordinary means, as the balance spring loses elastic force at an accumulating rate over the effect produced by the compound lamina of the balance, and consequently the chronometer can only be adjusted to keep the same rate at two points on the thermometer, between which it will gain..

The following appear to me to be the conditions which a perfect compensation for the secondary error should fulfil:

1.—It should gradually accumulate in effect from one extreme of temperature to the other, in the progression required . by the change of elastic force in the balance spring.

2.—The secondary compensation should be susceptible of adjustment by rule alone; for if this could only be effected by actual trial, as in the primary compensation, the extra time required would preclude the probability of its coming into general use.

3.—After it has once been adjusted the compensation should remain permanent and not liable to derangement.

4.—The secondary compensation should not interfere in the slightest degree with the action of the primary compensation; for as the motion of the laminae in a large box chronometer only amounts to $\frac{1}{150}$ of an inch, to produce a difference in the rate of 380 seconds a day, in a change of temperature from 32° to 100° Fah., any such interference would eventually prove fatal to the chronometer's good performance.

With reference to the first condition, I find by a great number of experiments and trials, extending over a period of ten years, partly made by myself and partly conducted at the Royal Observatory, Greenwich, that the law of loss of elastic force in the spring, requires $\frac{1}{12}$ of the entire compensation to increase over the effect produced by the compound lamina, in the progression shown on diagram, where the distance gradually accumulates throughout.

The different plans proposed for removing the defect were divided into two classes, one of which included those methods in which auxiliary weights were brought into action at certain temperatures; the other, the plans intended to produce an accumulating effect throughout.

The first class was represented by Mr. Eiffe's balance, and the second by Mr. Dent's, which were described by the aid of drawings, and their capabilities examined with reference to the conditions already laid down.

The last method introduced was that patented by Mr. Loseby, in which mercury is employed to effect the secondary compensation. The principle and action of this balance were fully described, and its ability to fulfil the necessary requirements tested by the conditions before applied to the others; and after noticing the object for which Le Roy employed mercury in the balance during the last century, the paper proceeded:

Having now considered the constructions themselves, and the principles on which they are based, I will proceed to notice the results obtained in actual trial.

Fortunately, in this country as in others, the Government has instituted trials of chronometers for many years past, and thereby afforded a practical test of the advantages to be derived from the improvements proposed from time to time: and at the present day, before any addition can be recognized as an improvement, it must have successfully established its title in the sharply-contested trials of the Royal Observatory.

Mr. Loseby then proceeded to give an account of these trials, from two letters on the subject addressed to the Board of Admiralty; one written by Mr. Dent, and the other by himself, from the latter of which the following Table is extracted, with the remarks immediately preceding it.

In extracting a summary from the rates, to show the reliance that can be permanently placed on the different constructions, I have included a period of five years, as the rates exhibit great uncertainty of the same maker maintaining the same position one trial with another; not, however, that this will favour my chronometers, for they have not only obtained the first position, but kept it four years out of the five.

The first Table consists of the errors of all the chronometers added together for the several years, and a mean taken of the whole; and the second Table contains the errors of my chronometers in the same years, so that a comparison of the two will show the amount of superiority on my chronometers over the general average.

ABSTRACT FROM THE RATES OF ALL THE CHRONOMETERS (140) WHICH HAVE BEEN TRIED AT THE ROYAL OBSERVATORY, GREENWICH, FROM 1848 TO 1852.

| Year. | Difference between the greatest and least weekly rate. | Greatest difference between one week's rate and the next. | Trial No. |
|---|---|---|---|
| | s. | s. | |
| 1848 | 27·2 | 12·9 | 53·0 |
| 1849 | 34·0 | 23·4 | 80·8 |
| 1850 | 37·0 | 24·5 | 86·0 |
| 1851 | 29·6 | 17·5 | 64·6 |
| 1852 | 28·5 | 19·3 | 67·1 |
| | 156·3 | 97·6 | 351·5 |
| Mean of 5 years | 31·3 | 19·5 | 70·3 |

ERRORS OF LOSEBY'S CHRONOMETERS IN THE SAME TRIALS.

| Year. | Difference between the greatest and least weekly rate. | Greatest difference between one week's rate and the next. | Trial No. |
|---|---|---|---|
| | s. | s. | |
| 1848 | 11·0 | 5·6 | 22·4 |
| 1849 | 17·3 | 9·2 | 35·7 |
| 1850 | 12·7 | 4·7 | 22·1 |
| 1851 | 16·5 | 4·4 | 25·3 |
| 1852 | 11·7 | 9·4 | 30·5 |
| | 69·2 | 33·3 | 136·0 |
| Mean of 5 years | 13·8 | 6·7 | 27·2 |

Since 1848 the trials have been rendered more severe by the chronometers being exposed to greater extremes of temperature.

The CHAIRMAN, in inviting discussion on the paper just read, said, that owing to the lateness of the hour, there would not be time to do justice to Mr. Wenham's paper; the reading of it would, therefore, be adjourned, together with any additional discussion on the present paper, until a future evening.

Mr. DENISON hoped, that every one interested in this question would expend twopence in the purchase of the Parliamentary Paper, No. 69, of this Session, containing Mr. Dent's letter. In regard to Mr. Loseby's answer to that letter, it simply suggested that Mr. Dent, in dividing the twenty-four weeks into three periods, was unfair, and his statements incorrect. He, Mr. Denison, had examined all the Greenwich lists, and he found that the only mistakes Mr. Dent had made were against himself. Then as to the fairness of Mr. Dent's plan: they must first inquire what secondary compensation was for? It was to prevent chronometers gaining at mean temperature when they were adjusted for extreme temperatures, and they wanted to get a period of, going, at each temperature as long as possible. As, however, there were only twenty-four weeks for trial, they could only get eight weeks of each temperature. This Mr. Dent had done, and the question was, had he done it properly? The Greenwich lists were made from January to July; the first eight weeks were the coldest, the eight middle weeks were nearest the mean temperature, and the last eight weeks of the twenty-four were the hottest. This was the best division they could get in England, and although there would be variations during each eight weeks, it did not do to split hairs in such an inquiry. What Mr. Dent has done was simply to take the temperature as given at Greenwich, and in taking each eight weeks he had estimated as fairly as was possible the causes of the variations. There were oscillations independent of temperature; but these they had nothing to do with. It was clear that in a country where they had but half a year's changes, the plan Mr. Dent pursued, if not absolutely true in its results, was the best they could get.

Mr. Denison then read the following Table of the comparative rates during equal periods of eight weeks, of cold, mean, and hot temperatures, of the most successful chronometers tried at Greenwich in the past five years, referred to by Mr. Loseby:

| | Cold. | Mean. | Hot. |
|---|---|---|---|
| 1848; range of temperature, 28° to 87°— | | | |
| Loseby . . . . | +1 | +5·5 | +3·3 |
| Loseby . . . . | +1·7 | +8·8 | +5·1 |
| Massey . . . . | —2·3 | —2·8 | —3·1 |
| 1849; temperature, 40° to 91°— | | | |
| Loseby . . . . | +7·7 | +12·1 | +18·1 |
| Eiffe . . . . | —6·2 | —7·6 | —10 |
| Poole . . . . | —9 | —5·8 | —3·6 |
| 1850; temperature, 22° to 105°— | | | |
| Loseby . . . . | —9·7 | —6·9 | —9·2 |
| Dent . . . . | —8·6 | —7·5 | —8 |
| 1851; temperature, 28° to 109°— | | | |
| Loseby . . . . | —1·7 | —3·2 | —9·8 |
| Lawson . . . . | —3·5 | —2·2 | —4·2 |
| 1852; temperature, 21° to 115°— | | | |
| Loseby . . . . | —9 | —6·5 | —6·7 |
| Dent . . . . | +4·6 | +3·6 | +4·8 |

The result was that Mr. Loseby's chronometers had been beaten every year with respect to the secondary compensation, for which his invention was designed; once by Massey, Eiffe, Poole, and Lawson, and twice by Dent; and moreover, that in two out of the three years since the trials became more severe as to range of temperature, Dent's chronometers had beaten all the others in the accuracy of the compensation; consequently Mr. Loseby's compensation could not be regarded as superior, or even equal to several others which were invented before his. What Mr. Loseby had effected was, by the devotion of his mechanical skill, the getting up of one chronometer annually of very great accuracy, as Mr. Dent had done in 1829; but that was a trial of skilful execution, not of scientific improvement. For this mechanical skill Mr. Loseby deserved great credit; and he, Mr. Denison, in his capacity of Reporter on Horology at the Great Exhibition gave him all praise for his execution. His chronometers were not the best, however, for secondary compensation, nor would they be whilst those of Eiffe, Poole, Massey, Lawson, and Dent remained.

The CHAIRMAN intimated that the paper of Mr. Wenham would be read on Monday evening next, and the discussion of the present paper would also stand adjourned to the same evening. He proposed a vote of thanks to Mr. Loseby for his paper, which was carried unanimously.

It was announced that, on Wednesday next, June 1st, being the last Ordinary Meeting of the present Session, the Council had determined to bring before the Society the Government Announcement of the Universal Exhibition at Paris, in 1855, and to appoint a Committee with a view to promote the due representation of British manufactures, and to report on what steps may be taken for obtaining the removal of those restrictions that would at present interfere with the full representation of British manufactures in France, in 1855.

## THE OFFICE OF SECRETARY.

THE Council think it right to announce that, on June 8th, they will, pursuant to the Bye-Laws, proceed to the selection of a Secretary, whose name will be placed in the next Annual Balloting List, with those of the other officers of the Society, for election at the Annual General Meeting.

The Council consider it due to the members to make this announcement, as they learn that candidates are now canvassing the members, which the Council deem premature, and likely to lead to inconvenience.

## CONVERSAZIONE AT THE MANSION HOUSE.

THE Lord Mayor, having invited the co-operation of the Council of the Society of Arts in promoting the objects of the Conversazione, and in procuring educational models and apparatus for exhibition on that occasion, they have issued the following circular to the Principals of Educational Institutions:

"Society of Arts, Adelphi, May 20th, 1853.

"SIR,—The Council of the Society of Arts have learned with much pleasure that the Lord Mayor has invited the Mayors of most of the cities and towns in the United Kingdom to a conference at the Mansion House on the 8th June next; to consider the present endeavours of the Government to extend a more general and a more practical study of science and art, as branches of the education of all classes of the community.

"His Lordship has also invited a large and distinguished party of persons interested in this question, as well as the delegates from the mechanics' institutions in Union with this Society, to meet the mayors on the same evening, and to give to them all an opportunity of meeting and conversing upon this highly important subject, which has been lately brought specially under the consideration of the Society of Arts.

"The Council consider that advantages may arise from this public-spirited proceeding on the part of the chief magistrate of the City of London, as important to the progress of education as those which were derived from the memorable entertainment given by Mr. Alderman Farncombe when Lord Mayor, in 1850, which preceded the Great Exhibition. The Council of the Society, in which the Exhibition originated, consider themselves bound to yield to his Lordship every assistance which it is in their power to bestow.

"The Council have considered that they might add to the value and practical character of the Conference by aiding his Lordship in collecting specimens of educational models, books, apparatus, and modes of instruction, of which experience has proved the success, and which it is desirable should be more generally known.

"I am therefore directed to inquire whether it would be possible to supply from the Institution with which you are connected, any articles; such as books, instruments drawing examples, diagrams, maps, models, philosophical apparatus, or other articles which may in any degree illustrate the mode of instruction followed, and also if you could make arrangements for a person to be at hand, to afford explanations.

"It is his Lordship's present intention to hold a second Conversazione within a short time; it would therefore be desirable if you could make arrangements to leave such articles at the Mansion House in the interval.

"I am, Sir, your very obedient Servant,
"EDWARD SOLLY, Secretary."

The Council have also issued a circular to the Manufacturers of educational apparatus, of which it may suffice to give the following extract:

"The Council understand that you have paid particula attention to the production of such articles, and it has been suggested to them that you and others in the same line of business would be glad of such an opportunity of affording information respecting the articles produced by you; and if so, they will make arrangements to place a certain space at your disposal, on which you may display any books, diagrams, apparatus, &c., having reference to education.

"It would be desirable that the articles should remain for a short time, as his Lordship proposes holding a second Conversazione. It would also be as well that some person should attend on your behalf, to give explanations as to the mode of using the apparatus, price, and other particulars.

"Every reasonable precaution will be taken for the security of the articles, but his Lordship thinks it right, to say that he cannot charge himself with responsibilities for loss or accident."

## COMMERCIAL EDUCATION AND TRADE MUSEUMS.

THE following interesting letter appeared in the *Liverpool Albion*, of May 23rd:

Collegiate Institution, May 21, 1853.

DEAR MR. MAYOR,—No one will be surprised that I should address you on the subject of commercial education. My business in life is the practical work of education in the second commercial town in the world. You are the chief magistrate in that town, and you have always been known for your lively interest in all branches of industry, and your sympathy in every effort to improve and elevate the condition of your fellow-townsmen.

It is quite evident that this country is in a critical condition as regards industrial instruction. The Exhibition of 1851 showed us very clearly that there is some danger of our being outstripped in the race of competition. The value of our local advantages has been in a great measure neutralised by increased facilities of locomotion: and it is generally agreed that the success of our efforts to maintain our pre-eminence in the practical arts will hereafter depend more on intellectual than physical causes.

Under the influence of these convictions, the Government Department of Practical Art and Science has been organized in connection with the Board of Trade—and, as it seems to me, very wisely organized, on the principle of giving aid to local Institutions without interfering with local self-government. In these circumstances, the large towns of England are practically asked what response they are disposed to give to the well-known sentence in the Queen's Speech on Nov. 11th, and how far they are prepared to avail themselves of the facilities which may be placed at their disposal by the Government. Liverpool, among other places, will presently be called upon to answer this question.

One answer which will probably be given by Liverpool, in common with other towns, will be the more general introduction into schools of some courses of instruction which have a direct bearing on the utilities of life, and the gradual adoption of such apparatus as the Government may be able to place on cheap terms within their reach. All this is evidently within the power of managers of schools; and their judgment will be shown by maintaining the due balance among different studies, and by holding a right course between too ready a compliance with a prevailing movement, and too strict an adherence to older precedents. Any attempt to turn schools into workshops will lead to disappointment; and if the highest purposes of education are sacrificed to mere utility, nothing but harm will be the result.

When, however, I look beyond the walls of our schools, and think of industrial instruction in its widest bearing on our whole population, I cannot but feel that this response would be inadequate and unworthy of Liverpool. Among the results of the Great Exhibition, it seems to be now understood that we are to look for the formation of a great Central Museum of Art and Manufactures, which of course will be situated in the metropolis. The usefulness of such an institution will hardly be disputed; but in order that its benefits may be fully diffused over the country, similar museums must be called into existence in all our great centres of industry. And it appears to me, that such collections ought not to be mere copies on a small scale of the collection in London—not miniature repetitions of every portion of the metropolitan institution, but rather full and detailed representations of whatever department of the Central Museum has special reference to the prevailing industry of the place where the Provincial Museum is situated. It would be easy, for instance, to define the nature of the collections which would be appropriate to Manchester, to Birmingham, and the Potteries. The great business of Liverpool is Commerce; and, without entering into details which would only encumber this letter, I will ust say that it would be worthy of the enterprise and public spirit of this place, if it were resolved that the Trade Museum of Liverpool should be grander and more complete than the Trade Department of the Central Museum at Kensington Gore.

Yet even a museum of this kind, useful and impressive as it would be, would be comparatively valueless, if no active courses of instruction were connected with it and based upon it. And this leads me to mention another subject, which, in my judgment, is well worthy of the attention of the merchants of Liverpool. Nothing is more painful to a schoolmaster who wishes to do his duty, than the early age at which boys are taken from school and sent to business. They are frequently removed at the very time when their improvement is just beginning; and, from the nature of the occupations into which they are thrown, their education is too often practically arrested in early boyhood. I am very well aware of the difficulties with which this subject is beset; and I do not doubt that many parents would be glad to see a higher education combined with the experience which must be acquired in an office. Is it not possible that these difficulties might in some measure be overcome, and these wishes partly accomplished, if higher courses of instruction could be organized, which might succeed the regular school training, and have a direct reference to the requirements of Liverpool? Might not many parents thus be induced to continue the education of their sons to a later point of that critical period which extends from fourteen to twenty years of age? I am suggesting what, in fact, would be a Commercial College, or a section of some great Industrial University. It would not be difficult to define the proper courses of instruction, which, as in the case of the museum, should have a strictly local reference. Physical geography, natural history, chemistry, the history of commerce, mercantile statistics, international law, are among the topics which immediately occur to the mind.

I could easily write at much greater length; but my simple object has been, by the aid of your name, to invite general attention to this subject. If this letter should meet with favourable attention, I shall be glad hereafter to lay before the public some suggestions in more minute detail.

I have the honour to be, dear Mr. Mayor, your very faithful servant,

J. S. Howson, M.A.,
Principal of the Collegiate Institution.

To Samuel Holme, Esq.

## OXFORD UNIVERSITY MUSEUM.

At a meeting of the Oxford University Museum Committee, held on Thursday last, the draft of the subjoined Report was read, and, on the motion of Dr. Daubeny, seconded by Mr. Maskelyne, adopted for circulation in the University:

### REPORT.

"The Oxford University Museum Committee have thought it expedient to lay before members of Convocation a succinct account of the present condition of the undertaking to which their attention has been drawn for several years.

"It is presumed that the circumstances which in 1847 led to the conviction that a new museum was required are well known—namely, that the Ashmolean Museum, the rooms for the geological collection, for the mineralogical collection, for the apparatus of the reader in experimental philosophy, were all, even then, insufficient for their several purposes; that there was no accommodation or collection provided by the University for either of the professorships of medicine, for the professor and reader of anatomy, no apartments for the professor of astronomy, nor for the professor of geometry, nor for the Sedleian reader in natural philosophy; that the inconvenience and loss in having the institutions that did exist separate and detached was great, and that for the practical work of students there was no accommodation whatever.

"To remedy this state of things was in 1847 desirable. Now (if the Natural Science School be not destined to become a dead letter) it is necessary. Accordingly, a site has been decided on for the new edifice; and the wants of the University have been stated in a few words by the delegacy appointed on February 17th last, 'to consider what museums, lecture-rooms, and other buildings are required for the study of natural history and physiology.'

"It remains to select a plan, and commence the work. Whatever plan be adopted, it is not necessary to complete the whole structure at once. But it is most expedient that any scheme which is approved should be at once philosophical, compact, convenient, and conceived not only for our present needs, but for posterity.

"In the opinion of the Committee, the report of the delegates, while sufficiently moderate in its proposals, combines these requisites; and if there be any particulars in which it may not come up to the expectations which may be entertained of a great university, it provides, as indispensably necessary to the design, that the building must be capable of extension in each and all of its departments.

"The Committee, therefore, earnestly recommend the report for adoption; and the result of this adoption, they hope, may be the early appointment of another delegacy, not for the immediate erection of the whole, but for the obtaining plans from architects for selection and approval. And they are the more urgent in their desire that this may be accomplished, because the University, by obtaining plans, will gain a more thorough conception of the required edifice, and of the wants of the University, and a more exact knowledge of the cost of supplying them, inasmuch as no architect could expect to compete with success in such a work who is not well acquainted with the great museums of Europe, and who has not ascertained the principles and mastered the details requisite for an institution, in which the natural history of the earth and its inhabitants is to be illustrated for a great educational purpose."

## NEW PATENT LAW.

The following extracts from a treatise on this subject by Mr. T. Webster, will be regarded with interest:

"The system established by the Patent Law Amendment Act must be regarded as the foundation whereof the superstructure has yet to be raised under the sanction of further legislation. The Act has swept away the foundation and sources of great abuses, and established a system having the following cardinal features: 1. Protection from the day of application. 2. One patent for the United Kingdom. 3. Moderate cost and periodical payment. 4. Printing and publication of specifications. 5. One office of patents and specifications. The Committee of the House of Commons introduced alterations, which, although not destroying the leading features of the new system, have materially impaired its efficiency, and which will occasion unnecessary trouble and expense and further legislation.

"Some of these alterations, so far as they interfere with the beneficial operation of the system established by the Act, have been already noticed; but other alterations of a more important character affecting the ultimate success and credit of the new system remain to be noticed. These may be regarded as omitted objects, and which must form the subject of further legislation. Some of these objects were prominently brought forward by Sir A. E. Cockburn, A.G., in moving the second reading of the Bill in the House of Commons in the Session of 1851, so that no doubt can be entertained as to the views of its promoters.

"Such were the terms in which the Bill of 1851, as sent from the House of Lords, was introduced to and received with acclamation by the House of Commons; the Bill of 1852, as sent from the House of Lords, with provisions for effecting the same objects, was referred to a Committee of the House of Commons; during the progress of the Bill in that Committee, the clauses for referring the provisional specification to examiners were struck out, and clauses referring the provisional specification to the law-officers was substituted; other apparently trifling alterations were made; the combined effect of which, however, was to retain and import into the new system most of the defects so strongly pointed out by Sir A. E. Cockburn, as connected with the tribunal of the law-officers.

"Upon the subject of the examination under the proposed system, considerable misconception existed in the minds of many members of the Committee; but the imminent danger which impended of the Bill being again defeated by want of time, rendered it inexpedient that anything should be done which might occasion delay. No opposition therefore was prosecuted to such alterations; the members of the Committee, who were thoroughly acquainted with the wants and wishes of inventors and manufacturers, thankfully accepted any portion of the measure as a first and great instalment of reform; and regard being had to interests in the three countries, which were pressed upon the Committee, and to the conflicting nature of the views suggested by the opponents of reform, the public are greatly indebted to the Committee collectively, for having saved so much of the original measure.

"The provisional specification and preliminary examination were intended to afford protection to the inventors and to the public. The visionary nature of many of the projects, and the visionary character of their authors, are notorious; the provisional specification and its examination by competent persons are calculated to check the mere speculative inventor, whose supposed invention in the majority of cases will not admit of being expressed in distinct and intelligible language. Such an examination would check the majority of applications at the first stage, and save further expenditure to the inventor, and the creation of privileges of no use but to invite and encourage litigation. The provisional specification and preliminary examination were approved of by almost every witness examined before the Select Committee of the House of Lords on the Bill of 1851, as affording a guarantee of the kind required. The opponents of patent law reform assigned much more extensive duties to the examiners than either the promoters of the measure, or the witnesses who gave evidence on the subject. The duties assigned were the satisfying themselves that the description was clear and intelligible, and that the invention was sufficiently defined; and many of the witnesses referred in support of these views to the beneficial operation of such examination under 'The Protection of Inventions Act, 1851.' It is true that some of the witnesses spoke in favour of the opinion, that such a board ought to or might judge conclusively on the question of novelty, but few concurred in that opinion.

"This duty of preliminary examination spoken to by almost every witness as of paramount importance, and as requiring time, knowledge, and attention, which the varied occupations and frequent changes of the law officers precluded the possibility of being adequately discharged by them, however great their scientific as well as legal acquirements, the Committee of the House of Commons thought fit to impose upon the law-officers, with whom now rests the responsibility, of certifying the sufficiency of the provisional specification, and that it states distinctly and intelligibly the whole nature of the invention, so as to apprise the law officers of the improvement, and of the means by which it is to be carried out.

"Time will show the result of this alteration in a fundamental principle of the measure, not only without any evidence to guide the Committee, but in direct opposition to the most positive evidence on the subject. If inventors, relying on the certificates which have been given, should be grievously disappointed in the result, it must not be laid to the new system, but to those who deprived that system of this great safeguard, and of the means of correcting evils and of relinquishing duties which the experience of all law officers had led them to wish to entrust to other persons.

"The reduction of the cost of patents has in this, as in other countries, acted as a great stimulus to invention, having placed the means of obtaining protection for and creating property in inventions within the reach of classes formerly excluded; but the corrective to such stimulus, as applied in every other country, is wanting, and no practical check upon the applications at present exists. The result is, that every inventor is tempted and induced to proceed through the successive stages, and to incur the whole cost of the patent—a consequence beneficial to his professional advisers, but very detrimental to the credit of a system framed with the view of preventing useless expenditure of money and time, and of checking as much as possible the creation of useless privileges.

"The evil last adverted to, namely, the stimulus which exists to prosecute every application for a patent, is augmented by another alteration, which gives colour for the opinion that the provisional specification was to be a secret document.

"This is contrary to the intentions of the promoters of the original measure, and to the spirit of the Bill of 1851. It might be expedient so long as any considerable number of patents granted under the old system remained unspecified, that the provisional specifications should be secret documents; but the period for the enrolling of such specifications having passed, the provisional specifications, when certified as sufficient, ought to be open to inspection. The Speech of Sir A. E. Cockburn, already quoted, assumed this; and the great object of provisional protection, namely, that a party may avail himself of the experience and knowledge of others, leads to the same conclusion.

"Further, the public and inventors have a right to know at the earliest moment, consistent with the security of the inventor, from what they are debarred; and it is contrary to public policy that such secrecy should exist. Such secrecy is an encouragement to crude and immature schemes, and injurious to inventors, who have a real interest in knowing at the earliest moment the demerits of their inventions.

"To suggest that fraudulent persons might thereby acquire a knowledge of the invention, and by means of such knowledge oppose the patent at a later stage, is to import into the new one of the crying defects of the old system, namely, that mere possession of an invention was a ground for opposing a patent, and to disregard the principle of the new system, that the first applicant has the *primâ facie* right.

"The suggestion of prejudice to the foreign patents is of the same character; no person ought to apply for a patent whose invention is not sufficiently matured to furnish a description for the foreign patents, and a short interval, as a fortnight, between the deposit of the provisional specification and its being open to inspection, would afford all the security that can be required in respect of the application for the foreign patents."

PRACTICAL DIRECTIONS FOR OBTAINING LETTERS PATENT.—The invention having been sufficiently matured, a proper title must be selected.

"A title having been selected, the provisional, or complete specification, as the case may be, must be prepared and written on paper or parchment of the proper size, and signed by the applicant, or the agent of the applicant, in the case of a provisional specification.

"The petition and declaration must then be prepared; the declaration is to be made before a Justice of the Peace (at any one of the police-offices in the metropolitan district), or before one of the Clerks for taking affidavits, at the Clerks' office, in Chancery-lane, or before a Master Extraordinary in Chancery or Justice in the country.

"The petition, declaration, and provisional or complete specification (care being taken that they agree with each other in the title of the invention and in the names and description of the applicant), with a stamp of 5*l.* affixed to the petition, are to be taken to the office of the Commissioners of Patents, in Southampton-buildings, Chancery-lane, and left there, when a receipt will be given.

"The applicant, after the allowance of the provisional protection shall have been advertised, if he be still minded to proceed for the patent, must give notice at the Office of the Commissioners of his intention to proceed, which, being recorded, with a stamp of 5*l.*, will be duly advertised.

"If no opposition be entered, the warrant of the law-officer, also bearing a stamp of 5*l.*, will be made out, and upon that the patent, also bearing a stamp of 5*l.*, will be issued from the Office of the Commissioners.

"These four several sums, or stamps, of 5*l.* are the only moneys which the applicant has to pay in the case of an unopposed patent.

"The opponent of a patent must leave particulars of objections at the Office of the Commissioners, with a stamp of 2*l.*

"Should the applicant after this proceed with his patent, a hearing will take place before the Law-officer, when the applicant and opponent will each have to pay—

| | |
|---|---|
| To the Law-officer - - - | £2 12*s.* 6*d.* |
| To his Clerk - - - - | 0 17 6 |

being the amount settled in the manner directed by the statute.

"The Law-officer, after hearing the parties, will grant or refuse his warrant, and give such directions as to costs as he may think fit.

"The patent, if the warrant be allowed, will be obtained from the office of the Commissioners as before.

"The complete specification, in cases in which a provisional specification had been deposited in the first instance, must be filed in the office of the Commissioners within six months from the date of the application; this also will bear a 5*l.* stamp."

# PROCEEDINGS OF SCIENTIFIC SOCIETIES.

INSTITUTION OF CIVIL ENGINEERS, May 24th, 1853. J. M. Rendel, Esq., President, in the Chair. The paper read was "A Description of the Newark Dyke Bridge, on the Great Northern Railway," by Mr. J. Cubitt, M. Inst. C.E. The structure consisted of two separate platforms, one for each line of rails, carried upon two pairs of Warren's trussed girders, each composed of a top tube strut, of cast iron, opposing horizontal resistance to compression, and a bottom tie, of wrought iron links, exerting tensile force; these were connected vertically, by alternate diagonal struts and ties, of cast and wrought iron respectively, dividing the length into a series of fourteen equilateral triangles, whose sides were 18 feet 6 inches long; the actual span of the girders being 240 feet 6 inches. Each tube was composed of twenty-nine cast-iron pipes, of 1½ inch metal and 13½ inches diameter at the abutment ends, increasing to 18 inches diameter with 2¼ inches metal at the centre of the span. The lower tie consisted of wrought iron links 8 feet 6 inches long, of the uniform width of 9 inches, but varying in number and thickness, according to the tensile strain to which each portion was subjected. The diagonal tie links varied from 9 inches by 15/16 inch to 9 inches by ¾ inchs The cast iron diagonal struts had a section resembling a Maltese cross, the area being in proportion to the compressive force to which they were subject. The total weight of metal in each pair of girders, composing the bridge, was 244 tons 10 cwt., of which 138 tons 5 cwt. were cast iron, and 106 tons 5 cwt. wrought iron, which, with 50 tons for the platform, &c., made the total weight of each bridge 294 tons 10 cwt., or 589 tons for the whole structure; and the cost, exclusive of the masonry of the abutments, and of the permanent rails, but including the staging for fixing and putting together, and the expense of testing, was 11,003*l.* In a series of experiments to test the stability of a pair of the trussed girders, at the works of Messrs. Fox, Henderson, and Co., where they were constructed, the following results were obtained. With a weight of 446 tons regularly distributed, which was equal to 1½ ton per foot run, plus the weight of the platform, rails, &c., lowered seriatim on the thirteen compartments, the ultimate deflection in the centre was nearly 6¼ inches. With a weight of 316 tons, equal to 1 ton per foot run, plus the weight of the platform, &c., as before, the ultimate deflection at the centre was 4½ inches. When the bridge was fixed in its place, a train of waggons, loaded up to 1 ton per foot run, extending the whole length of the platform, caused a centre deflection of 2¾ inches. The deflection caused by two heavy goods engines, travelling fast, and slowly, was 2¼ inches; and that produced by a train of five of the heaviest locomotive engines, used on the Great Northern Railway, was 2½ inches in the centre.

# PROCEEDINGS OF INSTITUTIONS.

DARLINGTON.—On Friday evening last an excellent Lecture was delivered at the Mechanics' Institution by Professor Nichol, of Glasgow, on the extent of the material universe. The lecture was kindly offered by Dr. Nichol in aid of the Institution, and the attendance both of members, and others, was large. The lecture was an eloquent discourse on the science of which the Professor is well known to be a distinguished votary.

LIVERPOOL.—The following lectures have been delivered in the Collegiate Institution between February and May; two on Herculaneum and Pompeii, by Mr. George Scharf, jun.; two on the Philosophy of Sensation, by Dr. Inman; three on English Ballad Music, by Mr. George Barker; one on German Ballads, by Mr. Grattan; two on the Heroes of the Reformation, by Mr. Lord (U.S.); two on Christian Missions in India, by Rev. J. Percival; and one on the Mollusca, by Rev. H. H. Higgins.

SEVENOAKS.—The first of a course of three Lectures, "On Physical Geography," was delivered on Thursday, the 19th inst., at the Literary and Scientific Institution, by Wm. Hughes, Esq., F.R.G.S., London. The subject will be divided into the "Ocean," "Earthquakes and Volcanoes," and the "Effect of the Atmosphere on Vegetable and Animal Life." The "Ocean" was the subject of the first lecture; its extent, movements, properties, and other phenomena, were enlarged on, and the lecture being illustrated by some well-executed maps and diagrams, made it the more interesting and instructive. Lectures at this Institution are continued throughout the year, at intervals of three weeks or a month, and are generally well attended.

STAMFORD.—At a recent meeting of the Members of the Institution, Dr. Hopkinson, the President, remarked that it was proposed to establish a class at the Institution for the instruction of children in certain branches of science not usually introduced in our schools. He considered the kind of information which it was intended to endeavour to impart at the meetings of this new class, would be of a character which was much needed, and would be most useful to young people; and he felt confidence in the success of the plan. He referred to the great interest taken by children in visiting the museum, and the anxiety and attention with which they listened to any explanation of its contents. These, he contended, were evident signs of a desire for information on matters which were strange to them; and it was with a view to supplying this blank, that he considered it desirable to give this new class a fair trial. In the course of his remarks, Dr. Hopkinson expressed his surprise that there still appeared to exist a certain jealousy with regard to the extension of education, and the spread of intelligence, when it was too obvious that many of our present evils arose from the want of sound and really useful education, and a higher degree of intelligence amongst the mass of the people. That the education now obtainable might be tolerably good for the wealthier classes, he did not deny; but for an extensive section of the great body of the people, who had but limited means, and for the poorer class especially, nothing could be worse or more defective than the present system.

WINCHESTER.—The annual general meeting of the members of the Mechanics' Institution was held on Wednesday evening, E. W. Faithful, Esq., Vice-president, occupying the chair. The report stated that the present number of subscribers was, members, 209; ladies, 31; juniors, 39; non-members, subscribing to the daily reading-room only, 14. The income for the past year, from all sources, was 210*l.* 7*s.* 8*d.* Considerable advantages had been derived from the union with the Society of Arts, and those advantages would increase as the arrangements of the union became perfected. The library had been considerably improved during the year, principally by donations from members, and now contained upwards of 3,000 volumes. The establishment of a daily reading-room had been carried out most successfully. The meeting then proceeded to the annual election, when the following Committee of Management was chosen:—President, Rev. Charles Walters, M.A., F.R.A.S.; Vice-presidents, E. W. Faithful, Esq., Mr. R. Hayles; Treasurer, Mr. W. Moody; Secretary, Mr. Tammadge; Curator, Mr. H. Newman; Librarians, Mr. J. Lansley and Mr. H. L. Smith; and without special office, Rev. F. Bugby, Messrs. G. Hill, W. T. Bracewell, E. Ventham, J. Castill, J. Crathern, S. Ventham, W. Tanner, S. Reynolds, W. Budden, J. Head, C. Newman, S. Hobbs, H. Butcher, J. L. Jardine, and H. W. Frampton.

YORKSHIRE UNION OF MECHANICS' INSTITUTIONS.—The sixteenth anniversary of this important Union was celebrated last week at Thirsk, and was attended by a large number of delegates and visitors. A meeting for conference and business was held in the morning; after which the delegates and visitors dined together at the Three Tuns Inn; and the proceedings were brought to a close by a tea-party and concert in the evening, which also took place in the public rooms. Mr. James Hole, the Honorary Secretary, read the report, from which the following is extracted:—At the last annual meeting the Union comprised 123 institutes, and this year it consists of 128, notwithstanding that 8 institutes have ceased their connection. Of the 8 institutes that have withdrawn, 5 have done so only because they ceased to exist. Most of them, your Committee regret to say, are in places where a population exists more than ample for the support of a prosperous institute, and even where a large amount of books and other property for the purpose still remain; and for the want of sufficient energy have been suffered to expire, as if, indeed, the presence or the absence of an institute was a matter of indifference, and incapable of exercising any influence on the welfare and prosperity of the place. Total number of institutes in the Union, 123. Total number of members reported in 86 institutes—males 14,962, females, 1,520; total number of members estimated in 25 institutes, 2,055; total in 111 institutes, 18,537. 23 institutes, neither report nor estimate. Total income reported of 81 institutes, 8,107*l.*; 42 institutes neither reported nor estimated. Number of volumes reported in the libraries of 86 institutions, 90,109; number of volumes estimated in the libraries of 21 institutes, 10,168; total in 107 institutes, 100,277; 16 institutes neither reports nor estimates. Circulation of books reported for 81 institutes, 300,653; 42 institutes neither reported nor estimated. Number of books added during the past year to the libraries of 77 of the institutes, 6,025. Periodicals reported in 77 institutes—weekly, 351; monthly, 507; quarterly, 57; total, 915. Total number of lectures delivered in 77 institutes, 665. Classification of 478 lectures in 67 institutes—scientific, 128; literary, 325; music, 25. During the past year your agent and lecturer, Mr. Thomas John Pearsall, has delivered 45 lectures, attended 14 soirées and other meetings, and visited 41 institutes for the purpose of conferring with the committees. 12 institutes declined receiving a visit, 17 made no reply; and, besides these, there were 15 institutes either temporarily suspended, discontinued, or withdrawn from the Union. The agent has reported to your Committee on the condition and prospects of the various institutes, and the general state of them appears to be very satisfactory and improving. That such is the case will be borne out by the following statement of the present condition of those institutes which, having furnished returns both last year and this, enable a comparison of their progress to be instituted:

| | 1852. | 1853. |
|---|---|---|
| Males in 75 institutes . . . . | 11,722 | 12,062 |
| Females in 57 ditto . . . . . | 1,347 | 1,326 |
| Income of 71 ditto . . . . . | £6,543 | £6,986 |
| Books in 73 ditto . . . . . . | 64,019 | 73,909 |
| Issues in 73 ditto . . . . . . | 251,297 | 241,367 |
| Lectures in 68 ditto . . . . . | 520 | 588 |

Your agent's report states, "In several places new buildings, or at least means of larger accommodation, are in contemplation. Bradford, business-like, has increased its accommodation at an expense of 800*l.*, and paid it off. Leeds has cleared off its mortgage debt. At Lockwood, near Huddersfield, it is likely that some steps will be taken for a building to provide for that place and the neighbouring villages. Churwell and Bramley contemplate some movement in this direction. At Batley, the foundation stone is laid for a new building for the institute and for town purposes, 750 shares being subscribed out of 1,000 before commencing. At Settle, I understand, a new and suitable building is under consideration. At Dewsbury, the plans are prepared for public rooms, and to accommodate the institute, at an expense of between 4,000*l.* and 5,000*l.*, about 2,000*l.* being already subscribed in sums of 200*l.* each; and other institutes are so far well situated that the raising of a building has been considered quite probable. Morley, Ripley, and Shipley, are of this class. Brighouse has a small but well-situated building, new this year, and, as I understand, built by the institute. At Kirkby Malzeard, the building is well advanced. At Rotherham, the new building is nearly ready. At Skipton, the land for a new building is secured, together with several handsome subscriptions. At Halifax, again, the land has just been selected on which it is intended to erect a building to cost 6,000*l.*; and to-morrow the first stone of the Darlington Institute will be laid, at which we trust many of the friends of education here to-day will be present." The advantage of the exertions to raise superior buildings for the purpose of the Mechanics' Institute is not restricted to the locality, but public spirit is awakened in other towns, which do not like to be behind their neighbours, and thus the general standard of intellectual activity is raised. One of the duties imposed upon us at the last annual meeting was, the obtaining of legal security for the property of institutions, in accordance with the carefully considered recommendations which our predecessors had obtained from competent legal authorities. The subject has not been overlooked, and the Committee's conviction of the importance of such legal protection remains undiminished. That no practical steps have been taken by us, has arisen from the fact, that the Union of Institutes in connection with the Society of Arts has devoted considerable attention to the same subject, and has intimated an intention of introducing a bill for the purpose into the legislature. In the last Report the Committee state that Mr. Traice had undertaken to revise the priced catalogue of books suitable to the libraries of Mechanics' Institutes, now out of print. The great additions recently made to this class of books, both in regard to their contents and cost, rendered a careful review of the works published within the last few years absolutely necessary. This has been carefully done, and the Committee are happy to state that the Catalogue is nearly ready to be placed in the printer's hands, and it will be issued as soon as practicable. Another subject to which attention was directed at the last Annual Meeting was the distribution of selections from the Parliamentary papers among the institutes. Since then a Committee of the House of Commons has been considering the subject, and there is little doubt that the wishes expressed in the resolution on this subject, passed at the last Union meeting, will be realised. One subject which has engaged a portion of your Committee's attention during the past year, has been the formation of village libraries. In many villages it was thought that though there might be neither a building suitable for a Mechanics' Institute, nor a Committee able and willing to conduct its various departments, it might still be possible to introduce one of its most valuable features, namely, a library. We felt it to be, if not one of the objects of the Union, to be strictly in accordance therewith, and for these reasons, and others which will be found in a letter from your Secretary, appended to this report, we resolved on making an experiment to establish libraries in the villages adjacent to Leeds. A Committee was formed to collect donations for this purpose, consisting of the Rev. W. F. Hook, D.D., J. H. Shaw, Esq., mayor of Leeds, the Rev. W. Sinclair, and E. Baines and T. Wilson, Esqs. The result of the Committee's applications was the sum of 134*l.*, which it will be desirable to raise to 150*l.* Two difficulties, however, have presented themselves to the immediate realisation of the plan. The first is, that several villages have been found to possess good libraries, where your Committee had supposed none to exist. The plan was meant only to supply books to places without them, not to supersede the existing libraries which, it is to be regretted, are very much neglected by those for whose benefit they have been established. The other difficulty is, that even in villages, where no library at all exists, it is impossible to establish one until a person is found in each place who will take charge of the books. This difficulty may probably be obviated by your agent, Mr. Pearsall, visiting such places during the summer months, when he is not so actively employed by his institutional visits, and making arrangements with suitable persons in each locality. At Rothwell, two gentlemen have expressed their readiness to act as local librarians; and your Committee propose, as soon as librarians are found in eight more villages, to commence active operations. Your Committee would offer a few remarks upon the miserably small proportion of the working classes who participate in the advantages which these institutes ought to confer. Is it that the working classes are not in a state to avail themselves of such advantages, or is it that the institutes are not adapted to those for whom they are meant? Probably both these causes may operate. Want of early instruction, and consequent dislike to all but sensual and debasing pursuits, may in many instances be the cause. In others late hours of employment may exercise a mischievous influence. In some cases, again, even poverty may be an obstacle. All these causes have been, and still are, operative; but all are, happily, in the way of rapid removal. It behoves us, then, to see whether there are not defects in the Institutions themselves, which prevent them attracting within their walls those whom it is pre-eminently desirable to reach. In the first place, then, we believe that the institutions are not sufficiently educative; they do not afford the class of advantages, alike the most useful and the most highly prized by those who need their aid. We look for the remedy in a great increase of the class instruction. It often happens that many of the village institutes have actually larger numbers absolutely, and very much larger relatively, to population, than the institutes in large towns. They are also producing a greater effect upon their members, most of whom belong to the manual labour class. The cause is solely attributable to the fact that they have discovered the main want of their subscribers, and brought all their energies to bear upon supplying that want. They have worked rather to make readers than to furnish books, and the consequence is that their little libraries are turned over many more times a year than in those institutes where the converse plan is pursued. The actual attendance of 59 institutes giving class instruction, and containing 11,813 members, is 2,810. It appears from the returns that even of the small proportion of members (under one-quarter of the whole) attending evening classes, four-fifths are in the elementary classes, as reading, writing, and arithmetic. It has been suggested by many persons who have wished to give Mechanics' Institutes a more practical relation to the pursuits of daily life, that certificates of merit should be awarded to those pupils who have passed through a certain prescribed course of studies. Such a plan was adopted in the Edinburgh School of Arts, in 1835, and has been continued with great success since that time. The pupil is required to give an attendance of three years,—mathematics employing the first year, chemistry the second, and natural philosophy the third. Any pupil who, after a proper examination, obtains an attestation of proficiency in each of the classes, obtains a diploma of life-membership, which gives free admission to the lectures, and admission to the library of the Institute, on payment of two shillings annually. Of the value of such certificate as a recommendation to employers, and an inducement to young men to study, it would be impossible to speak too highly. Your Committee are of opinion that no real and great improvements can be made in the classes without an addition to the fees paid in the large majority of Institutes.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

## MISCELLANEA.

THE SUBMARINE TELEGRAPH BETWEEN ENGLAND AND BELGIUM.—On the 6th instant, a cable of seventy miles, in one entire length, was laid down between England and Belgium with complete success, and communications were instantly transmitted over 500 miles of submarine and subterranean line, with two of 24-plates battery only. The Mediterranean Electric Telegraph Company, propose to unite Europe with Africa by continuing the electric wires, which now run without interruption between London and Genoa, to Spezzia. From the latter port they will cross the Mediterranean to Africa, passing by the islands of Corsica and Sardinia. It is further proposed to construct a subterranean line from Algeria, along the coast of Africa to Alexandria; and, with the support of the British Government and the East India Company, it will be easy to prolong the wires to Bombay, where they will meet the great line of 3,000 miles now in course of construction by the East India Company. The farther end of this chain may ultimately be carried to Australia.

LAUNCH OF THE "HIMALAYA."—On Tuesday last, the launch of the largest ship in the world—the huge *Himalaya*, built by Messrs. Mare and Son, for the Peninsular and Oriental Steam-Packet Company, took place. Her length aloft is 340 feet, and at the keel, 311 feet; depth of hold, 34 ft. 9 in., and burthen 3,550 tons, being considerably more than the *Great Britain*, once the great nautical wonder of the world. The engines are equal to 700 horses power, and are expected to drive her at a rate of from 12 to 14 miles per hour. The *Himalaya* was intended originally for paddles, but subsequently was adapted to the screw. The engines are in course of construction at Messrs Penn's. The *Himalaya* is to have an entire outfit of Trotman's patent anchors; the two bower anchors will be 48 to 50 cwt. in weight, whereas anchors of the old description would have reached five or six tons. She will have accommodation for 400 cabin passengers, 500 tons of measurement goods, and 1,200 tons of coal.

THE SUBMARINE TELEGRAPH BETWEEN GREAT BRITAIN AND IRELAND.—This important line of communication has at length been successfully effected by a submarine cable, manufactured by Messrs. Newall and Co., of Gateshead, and laid down by that firm on Monday between Donaghadee and Portpatrick. The cable consists of six communicating wires, insulated in gutta percha, and protected in the usual manner by an outer covering of iron wire. It could not be laid, as was intended, during the previous week, owing to the gales from the east preventing the opening of the dock gates at Sunderland to let the vessel containing it pass out As several previous attempts to lay a submarine telegraph across the Irish Channel had failed, every care was taken to ensure the successful termination of the present attempt; and the expedition, consisting of the screw steamer *William Hutt* (with the cable and apparatus on board), the *Conqueror*, and the *Wizard*, left the Irish coast, having landed the end of the cable at a point about two miles to the south of Donaghadee harbour, and commenced the submersion of the cable, under the guidance of Captain Hawes, R.N., specially appointed by the Admiralty, who rendered great assistance in determining and directing the exact course to be pursued. The cable was landed on Wednesday morning, in a sandy bay (called Mora-bay), a little to the north of Portpatrick.

PROGRESS OF EDUCATION.—A Parliamentary paper, published on Wednesday, contains a return of the number of scholars in day and Sunday-schools in England and Wales, in the years 1818, 1833, and 1851. It appears from this return, that in 1818, when the population of the United Kingdom amounted to 11,642,683, there were in England 19,230 day-schools, with 674,883 scholars, and 5,463 Sunday-schools, with 477,225 scholars. In 1833, the population was estimated at 14,386,415; number of day-schools, 38,971, with 1,276,947 scholars; and 16,828 Sunday-schools, with 1,548,890 scholars. In 1851, the population was 17,927,609; there were 46,114 day-schools, with 2,144,372 scholars; and 23,498 Sunday-schools, with 2,407,403 scholars. The proportion of day-scholars to the population in the years mentioned was as follows:—In 1818, 1 in 17·25; in 1833, 1 in 11·27; and in 1851, 1 in 8·36. The proportion of Sunday-scholars to the population was—in 1818, 1 in 24·46; in 1833, 1 in 9·20; and in 1851, 1 in 7·45.

THE ELECTRIC LIGHT.—On Friday last, one of the *Citizen* steamers started from Chelsea for Gravesend at 9 P.M., carrying an electric lamp, with a parabolic reflector on each paddle-box, returning to town at 3 A.M. The lamps brilliantly illuminated both banks of the river, shedding a flood of light on the objects and edifices in the way, including Chelsea College, the Houses of Parliament, St. Paul's, and Greenwich Hospital. The effect, as seen frόm the bridges, is said to have been remarkably striking and beautiful. The shipping in the Pool, below London-bridge, was as conspicuously seen as in the light of day—a most important fact in relation to the subject of safety to life at sea, and the national question of a perfect system of light-houses on the British coasts.

OCEAN PENNY POSTAGE.—A few weeks ago, when commenting on the answer made by Lord Aberdeen to the deputation of Oceanic Postage reformers, we put it to this body to reply, if they were able, in some practical way, to the assumption of the Minister that a fourpenny rate was not too much for the sea-carriage. An answer has been sent to us, giving the case of two American captains of sailing vessels, which proves—if the statement is correct, and if it be not correct the Post-office can at once contradict it—that the penny ocean rate is already in existence between this country and America. The case is this.—The two captains referred to sail to and fro between London and New York. They say, it is their custom "to leave a letter-bag for the reception of letters in some coffee-house in New York a few days before setting sail, with a notice that it will be closed at a specified hour. At the time appointed, it is locked up, brought on board, and conveyed across the Atlantic to England. On arriving off Gravesend the ship is boarded by the British Custom-house officers; and the letter-bag is put into their hands, under solemn affirmation by the captain that it contains all the mail matter on board to his knowledge. The officers then open the bag, count the letters, post them to the persons to whom they are addressed, each charged with 8*d*., the usual rate on sailing ship letters, and give the captain *one penny* each for his part of the service. This service includes not only the simple item of transportation across the Atlantic, but the putting up of the bag in New York, and sundry other little cares at that end of the route which are included in the inland services on letters crossing the sea and charged as such. Both these sea captains say that this has been a practice of long standing with them, and they presume a similar arrangement has been entered into with other American captains. For themselves, they were quite satisfied with what they have received for their part of the performance, for no freight in the world would pay them so well as the transportation of letters across the ocean at the rate of a penny each. They and the captains of the other American 'liners' would jump at the chance of conveying all the letters that crossed the sea at that figure." These facts are curious and important. We are aware that they do not answer the whole of Lord Aberdeen's objection,—but they unquestionably narrow it. If it be true that a penny rate will pay the cost under ordinary circumstances, it becomes the more necessary to show that the "usual conditions," an observance of which was part of the Minister's proposal, are necessarily so onerous as to require a tax of threepence on every letter to cover the cost.—*Athenæum*.

JUXTAPOSITION OF LEARNED SOCIETIES.—A deputation, consisting of Earl Rosse, Lord Wrottesley, Professors Bell, Forbes, and Grove, and Colonel Sabine, waited on the Earl of Aberdeen on Monday last, and presented to him a memorial, signed by a large number of the leading members of the Royal, Geological, Linnæan, and Chemical Societies, in favour of the juxtaposition of the chief scientific societies of London in a convenient and central building. The deputation were most courteously received by his Lordship, who fully entered into the subject, and promised to give it his best attention.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 14th, 18th, and 19th May*, 1853.
224 (1). Clitheroe Election—Index to Minutes of Evidence.
273 (1). Ecclesiastical Courts—Return.
446. Ecclesiastical Commission—Return.
415. Mayo Election—Minutes of Evidence.
191. Local Acts—Reports of the Admiralty.
407. Public Works (Bengal, &c.)—Copies of Reports, &c.
433. Bankruptcy (Ireland)—Returns.
436. Intoxicating Liquors (Scotland)—Return.
451. Lighthouses (Ireland)—Account.
452. British Registered Vessels—Return.
453. Pilotage—Returns.
483. Education (Ireland)—Annual Report.
455. Charitable Bequests (Ireland)—Correspondence.
458. Timber—Copy of Memorial.
426. Indian Territories—First Report from Committee.
474. Bills—Transfer of Land—Ireland.
477. ,, —Probates of Wills and Grants of Administration (amended).
480. ,, —Lunacy Regulations.
482. ,, —Lunatics' Care and Treatment.
485. ,, —Burgh Harbours (Scotland).
486. ,, —Recovery of Personal Liberty.
495. ,, —Income Tax.
481. ,, —Lunatic Asylums.
484. ,, —Copyholds (as amended in Committee, and on re commitment),
496. ,, —Customs Duties on Spirits.

*Delivered on 20th May.*

304. Harbours of Refuge—Return.
450. Steam-ship *Victoria*—Report.
472. Adulteration of Tea, &c.—Return.
491. Income Tax—Return.

*Delivered on 21st and 23rd May.*

429. Bolton Election—Report from the Committee.
456. Quarantine—Return.
457. ,, —Copy of Report.
462. Traffic with France—Return.
468. Poor Relief (Ireland)—Return.
476. Butter—Return.
490. Geographical Society—Copy of Memorials.
494. Exchequer Bonds—Copies of Treasury Minutes.
219 (1). Derby Election—Index to Minutes of Evidence.
261 (7). Civil Services—Estimates, Class 7.
488. County Treasurers (Ireland)—Account.
493. Election Petitions—Alphabetical List.
384. Cockermouth Election—Minutes of Evidence.
502. Bills—Bail in Error.
503. ,, —Registration of Assurances.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette*, 19*th May*, 1853.

*Dated 14th March*, 1853.

635. J. O' Leary—Emigrants' chests.
637. J. H. Johnson—Porcelain, &c., for ornamenting. (A communication.)

*Dated 15th April.*

906. J. W. Duncan—New combinations of gutta percha.

*Dated 19th April.*

947. E. Vivian—Cases for hats.

*Dated 23rd April.*

977. F. Tompkins—Embossing and finishing woven fabrics.

*Dated 27th April.*

1027. A. G. and J. B. Anderson—Treatment of saponaceous compounds.

*Dated 28th April.*

1032. P. Fairbairn and F. Kaselowsky—Machinery for drawing, &c., flax, &c.

*Dated May 4th.*

1085. E. Walmesley—Prevention of accidents in steam boilers.
1087. C. Videgrain—Preparation of natural and artificial stones for useful and ornamental purposes.
1088. J. B. Giannetti—Balloons for useful purposes.
1089. T. Masters—Apparatus for freezing, cooling, and churning.

1090. J. H. Hutchinson—Ventilating bricks.
1091. E. J. and E. J. Ockenden—Valves and stopcocks.
1092. J. E. Cook—Composition for preventing decay of exposed surfaces.
1093. J. B. Verdun and J. B. Marteus—Celestial and terrestrial globes.
1094. J. Scott Russell—Marine engines.
1095. C. Goodyear—Combination of India-rubber with certain metals.
1096. T. Taylor—Measuring and governing flow of liquids.
1097. W. E. Newton—Rolling iron. (A communication.)
1098. W. E. Newton—Treatment of fibrous substances, to ascertain moisture therein. (A communication.)
1099. J. Walker—Turntables.

*Dated 5th May.*

1100. W. Moore—Furnaces.
1101. J. D. Holdforth—Combing and dressing silk, &c.
1103. J. Rawe—Propelling.
1104. J. Livsey—Looms.
1105. J. C. Stiffel—Quartz-crushing machinery. (A communication.)
1106. M. E. Boura—Saddlery and harness.
1107. J. Whiteley—Warp machinery.
1108. J. Hetherington—Preparation of cotton, &c., for spinning.
1109. T. S. Prideaux—Propelling.
1110. T. Fearnley—Steam boilers.

*Dated 6th May.*

1112. C. W. Bell—Carriage-springs.
1114. G. Dowler—Match-boxes.
1115. A. Brackenbury—Precipitation of muriate of soda from solution.
1116. J. R. Danks and B. Peard—Nail manufacture.
1117. J. E. A. Gwynne—Peat for fuel.
1118. J. T. Stroud—Valves of pressure-lamps and burners.
1119. G. W. Jacob—Metallic covers for bottles, jars, &c.
1120. P. A. Le Compte de Fontainemoreau—Hat-plush. (A communication.)
1123. M. Riera—Fire-arms.
1124. F. Capeccioni—Candles.

*Dated 7th May.*

1125. J. Nichol—Bookbinding.
1126. C. R. N. Palmer—Communication between guard and driver.
1127. J. Pullman—Losh or oil-dressed leather.
1128. H. Warner, J. Haywood, and W. Cross—Machinery for frame-work knitting.
1129. H. Hughes and W. T. Denham—Weaving machinery.
1130. W. Boggett and G. B. Pettit—Heating by gas.
1132. A. Chaplin—Ships and boats.
1133. G. England—Screw-jacks.

*Dated 9th May.*

1135. J. Fisher—Propelling.
1136. D. Law—Moulding metals.
1137. J. H. Johnson—Combing, &c., wool, &c. (A communication.)
1138. J. H. Johnson—Coating and plating vessels, to resist acids and salts.
1139. P. Wright—Tew irons.
1140. T. Quaife—Watches, watch-cases, &c.

*Dated 10th May.*

1142. J. Brown—Anchors.
1143. J. T. and W. Clapham—Moulding and casting iron pipes.
1144. T. Murray—Breaks for wheeled carriages.
1145. G. Kane—Portable houses.
1146. O. H. Smith and Y. Parfrey—Carriage-wheels.
1147. R. Brown—Lifting and forcing water.
1148. G. Tillett—Metal bedsteads.
1149. G. and A. Roberton—Drying and finishing woven fabrics.
1150. W. Johnson—Sewing machinery. (A communication.)
1152. A. Chaplin—Transmission of aëriform bodies.
1153. G. S. Buchanan—Treatment of textile fabrics.

*Dated 11th May.*

1154. S. Russell—Razor-handles.
1156. M. P. F. Mazier—Reaping-machine.
1158. J. Crabtree and T. L. Scott—Preparing and spinning cotton, &c.
1160. R. Edmondson—Covered corded textile fabrics, and machinery for same.
1162. T. P. Jordeson—Rafting timber, &c.
1164. W. Bradbury and F. M. Evans—Taking impressions and producing printed surfaces. (A communication.)
1166. J. F. Belleville—Propelling.
1168. J. L. Stevens—Fastener for flowers.

*Dated 12th May.*

1172. G. F. Goble—Propelling vessels and carriages.
1174. M. W. O'Byrne and J. Dowling—Mangles.
1176. J. Sawtell—Economizing fuel.

APPLICATION WITH COMPLETE SPECIFICATION FILED.

1218. G. Berry—Roasting coffee, &c. 17th May, 1853.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 20th May, 1853.*

831. William Edward Newton, of 66, Chancery-lane—Improvements in the construction of, and method of applying breaks to railroad carriages, engines, and tenders, for the purpose of preventing collisions. (A communication.)
838. James Carter, of Trump-street—Improvements in the manufacture of certain articles of dress or apparel.
840. John Gedge, of 4, Wellington-street, Strand—Invention of an improved self-regulating artificial incubator. (A communication.)
924. William Slater, of Carlisle—Improvements in ovens and apparatus for baking.
974. Edward Tucker, of Belfast—Improvements in the manufacture or production of starch.
984. Thomas Challinor, of Bolt-court, Fleet-street—Improvements in apparatus to be applied to decanters and other bottles, to facilitate the running off liquids therefrom.
1095. John Filmore Kingston, of Carrol County, State of Maryland, United States of America—Improvements in obtaining reciprocating motion, and in propelling and steering vessels.
1194. James Edgar Cook, of Greenock—Invention of an improved composition for the prevention of the decay and fouling of ships' bottoms, and other exposed surfaces.
288. Richard Archibald Brooman, of 166, Fleet-street—Improvements in expansion-valves for steam-engines. (A communication.)
418. Thomas Clark Ogden and William Gibson, of Manchester—Improvements in machinery or apparatus for spinning cotton and other fibrous materials.
596. Francois Valtat and Francois Marie Rouillé, of Rue Rambuteau, Paris, and 4, South-street, Finsbury—Improvements in the construction of the combs of looms for weaving.
650. John Vandan Hielakker, of Brussels—Improved eccentric engine, applicable to the purposes of general navigation.
678. George Mackay, of Buckingham-street, Strand—Improvements in the manufacture of iron. (A communication.)
711. Antoine François Jean Claudet, of Regent-street—Improvements in stereoscopes.
818. William Johnson, of 47, Lincoln's-inn Fields—Improvements in weaving, and in the machinery employed therein. (A communication.)

*Sealed 21st May.*

813. John Weems, of Johnstone, Renfrew, N.B.—Improvements in obtaining motive power.
823. A. E. L. Bellford, of 16, Castle-street, Holborn—Improvements in drying-furnaces. (A communication.)

*Sealed 23rd May.*

836. William Oldham, of Southam, Warwick—Invention of an improved dibble drill.
837. Augustus Turk Forder, of Leamington Priors, Warwick—Improvements in fenders for railway carriages.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| May 19 | 3461 | Railway Roof Lamp | Thornton and Sons | Birmingham. |
| ,, 20 | 3462 | Writing-desk | John William and Thomas Allen | 18 and 22, Strand. |
| ,, 21 | 3463 | Improved Tallow Lamp | George Burt | Birmingham |
| ,, 23 | 3464 | Clover-rubber, for extracting the Seed from Clover-heads | William Batley and John Rivet | Bridge-street Works, Northampton, and Brington, Huntingdonshire. |

# SOCIETY OF ARTS.

FRIDAY, JUNE 3rd, 1853.

## SECOND EXTRAORDINARY MEETING,

### *Monday, May 30th*, 1853.

The Second Extraordinary Meeting of the Society was held on Monday, May 30th, Thomas Winkworth, Esq., in the chair.

A paper was read by Mr. Wenham, "On a Method of Constructing Glass Balance Springs, and their Application to Time-keepers."

After a few introductory observations, Mr. Wenham proceeded:

"I next contrived an instrument, in which a regular temperature can be maintained in the cone for any length of time, and which is also provided with a means of placing the axis at any desired angle, for the purpose of making the coils more or less open. It consists of a perpendicular rod, screwed into a heavy base loaded with lead, and a circular flat disc of brass, about one inch in diameter, provided at the back with a socket and clamping screw, for fixing it at any height on the vertical rod. The disc should be divided into degrees around its upper margin. To the flat face of the disc is fixed a piece of brass of rather less diameter, by means of a central screw, so as to allow it to rotate easily; this piece is shaped like the lid of a pill-box, and should have an index on the upper portion of its periphery, to point out the divisions on the disc. A steel rod is passed through two holes drilled in the rim of the rotating piece, in a direction across its diameter. The rod is kept in its place by means of a semi-circular brass spring, which is fixed to the inner edge of the rim of the rotating piece by means of a screw. The steel rod turns with a gentle friction, caused by the pressure of the spring, one of the ends of which enters a shallow groove turned around the rod for the purpose of preventing it from moving endways. One end of the steel rod is furnished with a milled head for turning it by, and the other end is provided with a screw socket, for containing the stems of cones of various forms and sizes. The cones are made hollow, and very thin, and they would no doubt be preferable if made of silver or platina; though I have used brass, and found it to answer very well.

"Each cone must be provided with a separate stem of steel, which must be turned down to a very small diameter next to the apex; this is necessary, to prevent the heat from being conducted away too rapidly when the cone is in a state of incandescence. The collar of the stem, where it screws into the rod, should have two facets filed upon it, for the purpose of unscrewing it by means of a pair of forceps or pliers, as any attempt to turn it by the cone would wring the thin neck asunder. Close to the apex of the cone there is a small hole drilled, for the purpose of containing the end of the glass thread about to be bent.

"The method of using this instrument is as follows. Having selected a piece of thin window glass, free from bubbles and veins, cut it into strips varying from one-tenth to one-eighth of an inch wide. Hold one of these at about three-quarters of an inch from the end, in the flame of a gas or oil lamp urged by a common blowpipe. When the glass is sufficiently softened, draw it out carefully and slowly into a thread of the required thickness, which may be easily done after a little practice. Break off a sufficient length to form the intended spring, leaving the portion of the strip of glass three-quarters of an inch long attached, as this will afterwards serve the useful purpose of a weight for drawing the thread close upon the surface of the hot cone during the operation of coiling up the spring. Take the free end of the glass thread just formed between the fingers, and hold it for an instant in the lower part of the flame of the lamp when not urged by the blowpipe; the end of the thread will then fuse, and form a minute bulb: allow this to cool, and then place it again in the flame and quickly withdraw it. This will soften the neck of the bulb, and cause it to hang at right angles to the thread. This may be performed without any difficulty, and is done in order to obtain a kind of hook at the end of the thread, for the purpose of suspending it by. Next bring the small hole in the apex of the cone into a position facing you, by means of the milled head, and pass the overhanging bulb at the end of the glass thread into it, and allow the piece of glass left at the other end to serve for a weight, to swing free. Now, by means of the division-plate, place the axis of the cone at the required angle, and direct a pencil of flame into its interior; the whole surface of the cone will then speedily acquire a red heat, which may be maintained with uniformity.

"When the cone has arrived at the proper temperature for softening the glass, turn the milled head at the other end of the rod in a direction from you, without removing the blowpipe, and the glass thread will be wound round the red-hot cone in a direction from the apex to the base, at the same time drawing up the piece left for a weight, which keeps the thread stretched, and causes it to ply close to the surface of the cone. When it has arrived at the base, allow the cone to cool, break the weight off the glass thread, and draw the bulb out of the aperture at the apex, and then push the coil back on the rod. Repeat this operation till you have made as many coils as the rod will conveniently hold, and remove them by unscrewing the cone.

"For the purpose of flattening the coil, get a piece of bar iron, about one inch broad and one-eighth thick; file the surface of one of the ends quite flat and smooth, and heat it in a clear fire to a dull red; free it from all particles of cinder, then take up one of the glass springs with a pair of forceps, and drop it upon the flattened end of the hot iron, which, if sufficiently heated, will immediately cause it to sink down close to the surface. When the iron has cooled down to below the softening temperature of glass, turn it over, and allow the finished spring to drop off, and heat the iron again for the next operation. If the spiral, when removed from the cone, does not stand with its axis perpendicular when placed on a level surface, it is apt to cause the coils to lay closer on one side of the spring than on the other during the flattening process. This may be remedied by properly inclining the hot iron just before the spring is placed upon it. This part of the manipulation is best performed by daylight, taking care not to make the iron too hot, or it may cause the glass to adhere to it. If these operations have been skilfully performed, the result will be a perfect and regular coil; and in the process of drawing out the glass thread, a practised hand may give it a regular taper, for the purpose of obtaining a spring, the coils of which shall gradually diminish in thickness from the circumference to the centre, which would be of great advantage in a spring made of the helical form; and if it should be found desirable that the coils should not all be equidistant, the cone can be turned in any desired shape, as a parabolic conoid, or be replaced by a cylinder: a spring of this latter description of course requires no after process of flattening, but is finished as soon as taken off the mould. The flat coiled glass springs are not so brittle as might be expected, but will bear a considerable amount of rough handling with steel forceps, and are only fractured by being bent at a sharp curve. I have given some of them upwards of four turns in one direction before they have broken."

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Mr. **Varley** said, that admitting the application to be practicable, he had not quite understood what were the advantages possessed by glass over steel.

Mr. **Wenham** said, the advantages were, that glass was less affected by heat than any of the metals; and that it was not affected by moisture and atmospheric influences, nor by acids, the slightest touch of which was sufficient to spoil a steel spring.

Mr. **Varley** added, that it was not affected by magnetism, as was steel; a circumstance of great importance for ships' chronometers. He thought too, that its lightness was a peculiar advantage; for once set agoing, it would more easily continue in motion. He was much pleased to hear of the equal action of these springs, the result of their perfect elasticity. The only doubt he had had was as to their durability, but this it appeared Mr. Wenham had satisfactorily met. He believed that steel made perfectly hard, would be as brittle as glass.

Mr. **Charles Frodsham** considered glass springs as ingenious, but useless, and not to be mentioned in comparison with those of steel. The late Mr. Arnold always repudiated any idea of their practical utility. Mr. Frodsham then exhibited and explained a model, showing the application of a glass spring which had been manufactured by Mr. James Scrymgeour, of Glasgow, in 1828, but which was useless for practical purposes. Glass was affected, however slightly, by changes of temperature; and if they had to compensate at all, it made little difference whether it were for ten seconds or a hundred seconds. It was well known that a pendulum always had a tendency to gain force, and with glass this tendency was much greater. If steel was liable to rust, glass was liable to vegetate, in addition to its being of a very brittle nature. To try its merits fairly, it should be tested as a main-spring; and no one, he thought, would attempt to make a main-spring of glass. He considered that it was absurd to talk of using shell-lac for joining pieces of mechanism.

Mr. **Denison** premised that he did not very well understand the matter practically, but he felt so much interest in it that he was very glad that his suggestion in the Jury Report of the Great Exhibition had called attention to the subject, and brought out Mr. Wenham. He had, however, made a slight mistake at that time; he had said that Mr. Dent had found some practical difficulties in the use of glass springs. Mr. Dent had since explained to him that these difficulties rather arose from his own caution, which led him to undue apprehensions. The present Mr. Dent on one occasion dropped a clock with a glass spring which did not break, although the fall broke the staff of the balance. As to Mr. Frodsham's remark, that glass was affected by temperature, that might be the case in Mr. Arnold's experiments, but they were not in possession of information as to his materials, and they did not know that his experiments were good ones; at all events it appeared that Mr. Wenham had succeeded. In saying that it made no difference whether they had to compensate for ten seconds or a hundred seconds, he thought Mr. Frodsham had fallen into an odd mistake; he did not think Mr. Loseby would agree with him there. In Mr. Dent's glass balance spring, he had no secondary, and very little primary compensation, and yet the rate was good; and if they could bring glass springs into practical use, they might do away entirely with secondary compensation. Then as to glass vegetating, of which he was not so sure, the balance of evils between that and steel rusting, he thought would be in favour of glass. As to Mr. Frodsham's last objection, that glass would not do for a main-spring, he really did not know whether it would or not, but he did not see what the remark had to do with its application to the balance-spring; he thought the best answer to all this was the fact that it really had succeeded, and one had been going twenty years which was made by the present Mr. Dent, then Mr. Rippon.

Mr. **Varley** said, glass with a melted surface would not vegetate.

Mr. **Wenham** remarked, that he had recently seen a microscopic object-glass, which had been in use twenty years, and the inner side of which did not show any signs of vegetation.

Mr. **George Frodsham** said, that if Mr. Dent's experiment had proved successful, it was quite certain he would have made more than one chronometer with the glass spring. He believed it had been given up by chronometer-makers as a perfectly impracticable and useless experiment. It ought at least to have been tested at sea. Whilst only one chronometer could be mentioned as successful with a glass spring, thousands had been successful with steel springs. The great losing tendency of glass was a complete barrier to its use.

Mr. **Loseby** said, glass had been tried repeatedly, and had been found to fail. It did not maintain its rate, and when taken to sea it would be like the ancient rope of chaff, and would fall to pieces.

Mr. **Denison** said, on behalf of Mr. Dent, that a chronometer with a glass spring had been at sea for years; that the parts were joined with shell-lac, and that it had answered perfectly well.

Mr. **Poole**, as a practical man, said, a great defect in glass arose from the fact that it could not be drawn of an equal thickness throughout its length, and he thought it next to impossible, therefore, to get an isochronous adjustment with a glass spring.

A **Gentleman** asked when the fall alluded to by Mr. Denison occurred, and how it was that chronometers with glass springs were not sent to the Admiralty for testing?

Mr. **Denison**, on behalf of Mr. Dent, said, the fall took place a long time ago; and the reason glass springs had not been brought into more general use, was, that they could not get workmen to use them. In reference to the use of shell-lac, it was well known that it was used for fixing the pallets of regular clocks.

A Gentleman remarked that the pallet was a fixture when once placed there, whereas the balance-spring might require frequently taking out.

Mr. Denison said, Mr. Wenham's contrivance met this difficulty. In reference to the impracticability of the application, he would just remark that the idea of its importance was not the mere fancy of some theoriser; he had made the remark on the subject in the Jury Report, simply because so many scientific gentlemen, especially from the Continent, had given so much attention to Mr. Dent's specimen in the Exhibition. He regretted much, however, that practical men should show such an aversion to the experiment.

Mr. Thomas Restell said, that he had devised an improved method of compensating for the expansion and contraction of balance-springs. The inner end of the balance-spring was, as usual, fastened to the axis of the balance, and its outer end was attached to the curved arm of a lever which worked round a centre pin, fixed near the outer edge of the plate of the chronometer, from which point the curve was struck. This curved lever was merely dropped on the pin, and was kept flat to the plate by means of an adjusting screw, traversing an arc or compound lamina of brass and steel. The lever would always be kept under this slide, by the desire of the spring to return to its former curve, whatever the temperature might be. The action of this compensating arrangement was as follows: supposing the balance-spring by an increase of temperature to elongate, then the arc or compound lamina of brass and steel would be drawn inwards, or nearer to the centre, and the point of contact of the curved arm of the lever and the balance-spring would be changed, so that though the absolute length of the spring was increased, its vibrating portion would continue uniform, and thus preserve the isochronism of the spring. This, however, would not be sufficient, as loss of elasticity in the spring had occurred, independently of its elongation; but the spring having now a stronger desire to return to its own curve, the elastic force was increased in a reciprocal proportion. If when tested it was found that the compound lamina by its expansion caused the lever to take up too much of the balance-spring, then the screw of the slide would have to be loosened, and the slide removed further from the centre. On the other hand, if the compound lamina did not expand sufficiently to correct the error produced by the elongation of the spring, then the slide would have to be moved and fixed nearer the centre pin. Should contraction of the spring occur by decrease of temperature, the converse of what has been stated above would take place. The advantage of this arrangement was, that the isochronism of the spring was always preserved, for there was no liability of the arc of the spring being injured, as it was unnecessary to remove the lever to unfasten the fulcrum, and therefore the centre of motion was at all times accurately preserved, and a uniform rate maintained between the adjustment for extremes. The evils accruing from the arcs of a compound balance always proceeding inwards with greater speed than outwards, were also avoided, and thus a gaining rate at mean temperatures was prevented. With this arrangement only a plain balance was required, and therefore the cylindrical form and the equilibrium of the balance were at all times preserved. It could be applied either to a duplex lever or to any watch sufficiently good to make it worth while to apply compensation, without there being any necessity for removing the spring balance, or for altering any part of the watch.

Mr. Wenham said, that if any faith could be placed in detached experiments, glass was certainly least affected by changes of temperature. In regard to compensation, he believed that fifteen out of sixteen parts were to compensate for the loss of elasticity in the spring itself, and one-sixteenth part only for the expansion of the balance. In answer to a question, as to whether the tables shown referred merely to expansion in bulk, or to variation in elasticity, Mr. Wenham stated that they referred to elasticity.

Mr. Loseby declined to enter further into the discussion in regard to secondary compensation, on account of the lateness of the hour; and stated that he would make some remarks through the Society's Journal.

Mr. Denison explained, in reference to the discussion on Wednesday evening, that in one page of the Greenwich lists, the weekly sums of daily rates were arranged by the Astronomer Royal in the order of *temperature*, not of time; so that if a week in January was warmer than one in May, that week in January would be placed after that in May. It was from this page that Mr. Dent's subdivision was made. He concluded by moving a vote of thanks to Mr. Wenham, which was seconded by Mr. Varley, and unanimously agreed to.

## TWENTY-THIRD ORDINARY MEETING,

### *Wednesday, June 1st,* 1853.

The Twenty-third Ordinary Meeting of the Society was held on Wednesday, the 1st instant, the Right Hon. T. Milner Gibson, M.P., in the chair.

The following Institutions have been taken into Union since the last meeting:

268. Deptford, Institution.
269. Wisbech, Mechanics' Institute;

and the names of four Candidates for Membership were read.

The Secretary said that the Council having determined to bring before the meeting the subject of the French International Exhibition of 1855, as affecting the interests of British manufacturers, and the international commerce of the two countries, he had drawn up a brief statement which must be regarded as merely introductory, and as serving to indicate the general nature of the questions proposed for consideration. He said—

"I would in the first instance draw your attention to the announcement recently made by the French Government, and communicated officially to the Board of Trade through the French Ambassador—namely, that it is proposed to hold at Paris in the year 1855, a universal Exhibition of agricultural and industrial products, and that every possible facility will be afforded to foreign exhibitors by the various departments of the French Government. The ambassador further expresses a hope on behalf of the Government, that the attention of British manufacturers will be expressly drawn to the intended Exhibition of 1855, and that they will respond to the invitation with the same ardour, as the French manufacturers did to the British Exhibition of 1851.

"The French nation have long known and felt the practical value of Exhibitions; for many years they have held consecutive industrial expositions in which was clearly shown the progressive development of each art; and the exertions of manufacturers received that spur and stimulus, which could not fail to arise from the gratification of fame and praise coupled with increased profits, and extended prosperity. These Exhibitions were however wholly French, it was the emulation of Frenchmen—one against another—the comparison of French productions and French manufactures alone. It was reserved for our own country to propose, to arrange, and to carry out successfully — an international Exhibition, in which a trial of skill of different countries and the manufactures of different people should be made.

"The Great Exhibition of 1851 must not be regarded as a mere extension of the principle already proved and established in the previous French Expositions; the international character, which was its chief feature, gave to it a new and vastly superior importance to that possessed by any former Exhibition, because it embraced not merely the question of the progressive advance of a single country, but went at once to the relative resources, industrial energies, and consequent future powers of all the civilised countries of the globe. The international character of the Exhibition of 1851, took from it at once the aspect of a mere competition amongst manufacturers and shopkeepers, and gave to it all the importance of a great political influence. At the close of the year 1851 some of our manufacturers were heard to complain that their fears had been realized—that foreign rivals had carried off the orders which they ought to have received, and that they had gained nothing in return. The results of a great international Exhibition were not, however, to be looked for in a few months; they were to be sought for in after years, and they will surely come—all the more surely, because the changes which they produce are slow and gradual.

"The great experiment having been tried, and having proved so eminently successful in many respects, the French Government are not slow to adopt the new principle thus established; they invite the industrial world to meet in Paris in 1855, and they propose to repeat the peaceful rivalry of 1851, with all the method, science, and arrangement which matured thought and accumulated experience can suggest. They invite—nay, they almost challenge British manufacturers to come and exhibit—to meet them with the same readiness and cordiality with which they met us in 1851. The question thus naturally arises, What are the precise terms of their invitation? is it one that our manufacturers ought to accept? is it one that they can accept? And in considering these questions, we must bear in mind what are the real objects of an international exhibition, and what are the fundamental principles on which it should be conducted."

Mr. Solly concluded by pointing out the various commercial restrictions which at present interfered with the trade between the two countries, and the existence of which might, to some extent, deter English exhibitors from sending their goods to Paris.

The CHAIRMAN expressed his satisfaction at the promptitude with which the Government had given publicity to the interesting project of a great international Exhibition of Works of Industry, in France; and he thought the Society of Arts had taken a proper course in seizing this early opportunity of considering what measures might be adopted, in order that the exhibition might be as perfect as he was sure the people of England would desire. There could be no doubt, as the Secretary had remarked, that something more than a mere removal of the prohibitions at the time of the Exhibition would be required to enable the manufacturers of Ergland to exhibit their works. Unless it could be seen that there was to be some permanency in these facilities for the introduction of our manufactures and works of art into France, one great inducement to exhibit would be absent; for if it were known that when a person exhibited his goods, showing excellence combined with cheapness, that he was to be deprived, by means of these prohibitions, of the advantage which might result from exhibiting them, a very powerful motive would be destroyed. He therefore considered it was a wise and judicious course in the Society, to give its attention to the effect which light duties and prohibitions must have on the success of the projected Exhibition. It occurred to him that this might be something like a precursor of free-trade in France; but, at the same time, they must not forget the difficulties which Governments had to contend with in bringing into effect a free-trade policy. They well knew that it was not until after a long conflict that the recent considerable relaxations had been effected in the commercial system of this country. Even now they had not accomplished fully the object of free-traders; there still remained much to be done; and whilst it might be right to comment on the prohibitions and high duties in the French tariff, it was only fair not to forget that England still imposed almost prohibitory duties on the wines of France, so as to entirely prevent the inferior qualities of wines coming into general consumption in this country. And although they might reasonably expect great changes in the direction of free-trade in France, they must not forget in making these efforts, how much remained unaccomplished in England. He made these remarks, because he knew there was a strong tendency in mankind generally, when they had accomplished, by a long process of argument, any great change in their policy, the success of which experience proved—to take it for granted that all the rest of the world ought to jump to the same conclusion. He hoped, therefore, they would remember the difficulties in regard to this question which other Governments had to encounter; the prejudices to be overcome, and the vested interests that would be opposed to it. He trusted that Englishmen would do all in their power to make this Exhibition as successful as was their own; and that the Society would leave nothing undone to bring out the greatest amount of sympathy in this country in regard to such a noble undertaking.

Mr. P. GRAHAM remarked, that a great many of the important manufactures of this country were entirely prohibited in France. Carpets wholly of wool were prohibited. Brussels, tapestry, and velvet pile carpets were charged 250 francs per hundred kilomètres. Carpets made in one piece, such as Turkey and Axminster, at the rate of 500 francs per hundred kilomètres. Furniture, of which he was a manufacturer, was charged 15 per cent. *ad valorem*, whilst with us it was only 10 per cent. He thought this discussion came very opportunely, because England was just about to make considerable ameliorations in its tariff, which would be peculiarly in favour of France. As a manufacturer he might say, that he would be very glad if furniture was allowed to come in altogether free; he had no fear of the most unfettered competition. The reductions proposed by the Chancellor of the Exchequer were, in printed paper-hangings from 2¼*d.* to 1¼*d.* per yard; in bronzes from 10 per cent. *ad valorem* to 10*s.* per cwt., which would be on an average, about 2 per cent.; Aubusson carpets from 15 per cent. to 6*d.* per yard, or about 4 per cent.; and mixed fabrics of silk and wool from 15 per cent. to 1*s.* per lb., or about 10 per cent. Manufactures of goat's wool, as Utrecht velvet, which had been charged 10 per cent., were to come in free; clocks which had been 10 per cent., were to be reduced to a rated duty averaging about 4 per cent.; and coloured porcelain from 10 per cent. to a nominal duty of 10*s.* a cwt. As therefore we were about to make these ameliorations, he thought it a favourable opportunity for putting forth our views in regard to the influence of a high tariff on the coming Exhibition. It was difficult to understand what inducement there would be for an English manufacturer of any great staple commodity to send it to France for Exhibition when he was deprived of the benefit of any consumption of such commodity by these prohibitory duties. It was true there was the one inducement, that in exhibiting his goods in France he was not simply exhibiting them to Frenchmen, but to the whole world; as there would be assembled at that time in France, Americans, Germans, Spaniards, Russians, and others, who would then see English goods side by side with those of France, and would be able to form a fair opinion of their respective merits. There was another circumstance that should be remembered; the French hitherto in their exhibitions had not taken cheapness into account as an element of merit. They had regarded superb qualities, rich dyes, beautiful designs, and skilful execution, rather than cheapness. English manufacturers, on the contrary, gave attention to the wants of the million, and aimed at producing a good and useful article at the lowest possible price; and unless, therefore, cheapness was recognized at the coming Exhibition as an element of merit, there would be amongst English manufacturers a natural disposition to shrink from the competition. Speaking personally, he should probably, under any circumstances, send something; but speaking generally, he believed that there would be an unwillingness to exhibit unless some alterations were made in the tariff, and unless the conditions of success observed in former French Exhibitions were somewhat modified.

MR. WINKWORTH said, he was struck by what the Chairman had remarked in reference to the hesitation which persons and nations naturally had to give up a long-cherished series of opinions, whilst they were too much in the habit of taking it for granted when they had got light, that the rest of the world ought to receive it at the same time. Now of all the nations of the civilized world, none were so difficult to move in these matters as their neighbours of France. It was well known that attempts had been made more than once to induce them to open their Quinquennial Exhibitions to the subjects of other nations. They had, however, always refused, and it was therefore a great relaxation of their former exclusiveness that they were now willing to admit the products of all nations. But whilst they were willing to do this, it was still possible that they might not see or acknowledge that by relaxing duties and taking off prohibitions, their own manufacturers would be gainers. He thought, perhaps, that a slight reference to the silk trade, in connection with which he had spent a great part of his life, might, by showing its effects in this country, have a tendency to open the eyes of that portion of French manufacturers; and, by a parity of reasoning, other manufacturers might see that there were two sides to the question of free-trade and prohibition. He was in business in the silk trade in Spitalfields at the time when Mr. Huskisson proposed to interfere with that manufacture. Up to the year 1824, the silk manufactures of other countries had been prohibited in this country. The silk manufacturers almost universally (there were a few exceptions, of which the firm to which he, Mr. Winkworth, belonged was one) resisted Mr. Huskisson's proposition for admitting them. In the year 1826, when the silk goods of other countries were allowed to come in at 30 per cent. duty, the importations into this country of raw and thrown silk were about 1,250,000 lbs. In the year 1847, the year before the French Revolution, which occasioned a disturbance in the ordinary course of trade, the importation of raw silk rose to 5,106,200 lbs. In France, during the same period, the consumption was 4,330,000 lbs., of which only 2,100,000 lbs. was of home production. So that it appeared, that between the years 1826 and 1847, the increase of English manufactured silk was fourfold, and of course there was a corresponding increase of employment for operatives. Now, it must be borne in mind that this result was obtained at the time when England was importing large quantities of silk goods of French manufacture. So great was the increase, that the trade removed from Spitalfields, and extended itself into Macclesfield, Manchester and other districts. He therefore thought, that if they went a little further they would see that this was not the only advantage which arose from the relaxation, because, if they imported goods from another country, they must pay for them in some way or other, and this had been done by the export of other English manufactures, of which the raw material cost less, and the same amount of capital being spread over a larger surface of labour was, as far as the operatives were concerned, highly beneficial, and productive of increased advantage to this country; and thus, either to France or through France, more had been exported than had been received. Another advantage was also gained: when trade was bolstered up by prohibitory duties, nations cultivated a trade in articles at a great expense to the consumer, which might be purchased at a much lower rate from countries possessing greater local facilities for their production; whereas, in consequence of these relaxations, each country produced that article for which it was peculiarly adapted, and by a general free exchange advantage was gained by all. Thus in England they found that plain goods were an article of large manufacture, whilst in France they had greater facilities for the production of fancy goods. Now, by free trade they would learn in what direction these advantages might be best attained, and thus cheapness and excellence would be the result. He hoped France would receive this statement, and analyse it, as an instance of what would be the case in other manufactures besides silk; and in reference to it he ought to add, that many of those silk manufacturers who in 1824 objected to Mr. Huskisson's scheme for admitting foreign silk at all, were now petitioning the Government that the duties imposed might altogether cease.

MR. SIDNEY doubted whether it was the duty of the Society of Arts to discuss this question, it being one essentially belonging to political economy. It must be remembered, too, that the question of free-trade was not new to France; M. Turbot and M. Bastiat had written more ably on the question than any English writer, but without producing much effect on the French nation. If English manufacturers sent goods to this exhibition, and showed they could manufacture them cheaper than the French themselves, that might have a beneficial influence on the people. A cheap carpet or a cheap plough would attract their attention, and would be a free-trade argument they could understand. On the other hand, any attempt to persuade them to alter their tariff would be regarded as one of the tricks of *perfide Albion*, and would do more harm than good; and if English manufacturers declined to send goods unless these restrictions were removed, the French would simply answer, "We can get a good Exhibition without you."

Mr. **Marshall** apprehended that the question was not one of tariff at all, but what was best to be done to promote the coming Exhibition at Paris. He submitted their business was to inquire whether—however slowly they had arrived at their present position, as they were progressing towards the right goal—it was not their duty in a frank spirit to communicate any measure of light they might have on the subject? If the Parliamentary debates on the question of free-trade were examined, it would be seen how slowly they had advanced towards a right appreciation of the subject, and they would be convinced that they were in no position to cast stones at France, or any other country, in reference to it. He believed the time was not far distant when France would see that her interests were interwoven with free-trade, and that every Exhibition of this kind, promoting as they did intercourse among nations, was step by step producing those results which would sweep away all commercial prohibitions. Whatever might be the decisions of France, he hoped that no prejudices about tariffs would be allowed to interfere with the success of this great undertaking. He felt persuaded that English manufacturers would send their goods for exhibition, and if not sold there, be quite content to bring them back and sell them elsewhere.

**Mr. Varley** observed that evil would never be overcome by evil, and advised English manufacturers to look to the generous side of the question. It would be worthy of the English people to accept the invitation, even if France made no relaxation in her tariff.

Mr. **J. Bennett** remarked that it would be impossible to be generous without gaining advantage at the same time. Even if English manufacturers found their goods inferior when placed beside those of French manufacturers, they must be benefited by the competition. He referred in illustration of this to the effect of the Great Exhibition on the manufacture of English watches and clocks, when their deficiency in point of taste and ornament, as compared with those of Continental workmanship, was strikingly manifest; but by it an impetus had been given to improvement in that direction, such as nothing else could have produced. The English trade in these departments, so far from having been injured, was now so brisk that every watch made could be sold in foreign markets, if they were not required for home use. He referred to the advantage of the division of labour in that trade, and stated that a common verge movement could be bought for 7½*d.* in France, whereas here the same movement would cost 2*s.* 6*d.* or 3*s.* 6*d.*; the difference being solely attributable to the greater subdivision of labour adopted on the Continent in this branch of trade than was the case in England. In hardware the very opposite was the case: for instance, at Sheffield a knife would pass through ten or twelve hands, whereas in Paris, probably not more than one man would be concerned in the production of such an article, except, perhaps, that the handle might be made by another person.

**Mr. Henry Cole**, C.B., made some remarks justifying the course the Council had taken in bringing this subject forward, observing that political economy, so far as it affected commerce and arts, was most decidedly within the scope of the Society's objects, and its consideration one of their primary functions. In reference to the idea of an international exhibition having originated with England, he thought their Secretary was to some extent in error, for he held in his hand a Report which contained a letter from M. Buffet to the Chamber of Commerce, Paris, in which the germ of that idea was contained. M. Buffet said, referring to the National Exhibition of June 1st, 1849, then in course of preparation:—"It has occurred to me that it would be interesting to the country in general to be made acquainted with the degree of advancement towards perfection attained by our neighbours in those manufactures in which we so often come in competition in foreign markets. Should we bring together and compare the specimens of skill in agriculture and manufactures now claiming our notice, whether native or foreign, there would doubtless be much useful experience gained; and above all, a spirit of emulation which might be made greatly advantageous to the country. You will therefore first give your opinion on the abstract principle of exhibiting the productions of other countries; and should you consider the experiment ought to be made, to enumerate to me officially the articles you consider would most conduce to our interest when displayed at the ensuing Exhibition. . . . . The experiment we are about to make, if I am well informed, has been already tried in two exhibitions, undertaken some years ago by the Chambers of Commerce at Lyons and Mulhausen. The example thus given in the provinces will doubtless be worth following on a more extended scale." The idea seemed clearly developed there, but the French people in 1849 were not disposed to work it out.

Mr. **Lavanchy** deprecated any interference with the tariff question. There was not at that moment a Chamber of Commerce in which it was not under discussion, and any attempt to precipitate the question would certainly act injuriously, and embarrass the rulers of France. They would, moreover, postpone by interference what he believed to be very near at hand. As to English manufacturers sending goods to the Exhibition, he thought no man with the slightest regard for the good of the community would have any hesitation, because it would be in reality submitting them to the world, and not simply to France.

**Dr. Foucher**, a German free-trader, said, he was reminded of an occasion some time ago, when he occupied the place the Secretary then occupied, at a meeting of a Society in Hamburg, when the question to be considered was the Great Exhibition of 1851. He had just thought what would have been the case then if they had entered into a similar comparison as that which had been instituted during this discussion. In Hamburg they had no tariff; and the comparison with England would not therefore have been favourable, if they had made that a consideration. In Switzerland and in the Northern States of Germany there were no prohibitory duties; still that did not prevent their exhibiting in Hyde Park. Why then should England make this a condition whether she should or should not send her goods to Paris? The question of free-trade appeared to him simply a question of stupidity, and he did not think it wise to tell any people of its stupidity. England would not have liked other nations to interfere to tell it how stupid it was in the matter of free-trade; and France was more jealous of foreign interference than even England.

The CHAIRMAN, in rising to propose a vote of thanks to Professor Solly for his interesting paper, said, the question before them was not whether any step should be taken to represent to the French Government any particular views as regarded their commercial policy, but simply to consider if they could suggest anything to promote the success of the projected Exhibition. They wanted to see it successful, and if any one thought there was anything in the tariff or customs' regulations of France calculated to mar the success of the Exhibition, and mentioned that temperately, not in a spirit of dictation, he thought that such a course would promote rather than injure the project. He therefore felt that there was nothing in the discussion of such a subject that was not strictly within the province of the Society of Arts, Manufactures, and Commerce. He concluded by moving a vote of thanks to the Secretary, which was passed unanimously.

The Secretary announced that at the Meeting of Wednesday, June 8th, the Council would render an account of their proceedings for the past year, and the Auditors would present a statement of the Receipts and Expenditure during the same period.

The Secretary likewise stated that the Annual Dinner of the Members of the Society, of the Representatives of the Institutions in Union, and their friends, would be held on Thursday, the 9th instant, after the Conference between the Council of the Society and the Representatives of the Institutions. Also, that the Directors of the Crystal Palace Company had invited the Members of the Society and the Representatives to inspect their grounds and works on the morning of the following day, Friday, June 10th. On the same day (Friday), at half-past four o'clock, P.M., the Annual Distribution of Medals and Premiums will take place, at which His Royal Highness Prince Albert, K.G., the President, has graciously consented to preside.

## NOTICE TO INSTITUTIONS.

THE attention of the Institutions in Union is particularly directed to the subject of the Circular which follows this notice. That Circular has been issued to the principal publishers and booksellers of the United Kingdom, and will be sent on application to any others.

Society of Arts, Manufactures, and Commerce,
Adelphi, London, May 14th, 1853.

SIR,—The Council of the Society of Arts, Manufactures and Commerce, has directed me to address to you a proposal on behalf of the Literary, Scientific, and Mechanics' Institutions, which have been taken into Union with this Society. The object of this Union, and some of the modes by which those objects are to be pursued, may be gathered from the enclosed statement.

265 Institutions have already been united to this Society, and their number is constantly increasing. A great many of the Institutions have requested the Council to organize a plan for affording to them through the Society such advantages in purchasing books and maps at greatly reduced prices, as are afforded by the Education Committee of the Privy Council to the schools in union with that Committee.

The Council of the Society of Arts does not doubt that the Publishers and Booksellers of the United Kingdom feel a liberal interest in the Literary, Scientific, and Mechanics' Institutions, and will co operate in any suitable arrangements for enabling them to improve their libraries consistently with the ordinary customs of trade.

It is understood that the arrangements which many of the most eminent Publishers have made with the Privy Council for the supply of books and maps to Schools, have, directly or indirectly, had a beneficial operation, not only on the Schools, but also upon the interests of the publishing and bookselling trades, and it is now proposed by this Society that very similar arrangements should be made for supplying their Institutions with books and maps.

It has been ascertained that in many instances the Institutions already enjoy at retail purchases the benefit of large reductions on the publishing price; so that in order to make it worth their while to combine for the purpose of purchasing wholesale through this Society to an adequate extent, it would be requisite that the wholesale reduction of price should be very considerable indeed; certainly not less than that obtained by the Privy Council, which is understood to average 43½ per cent.

It is unnecessary to point out what a powerful stimulus would be given to the publishing and bookselling trades, if the 800 Institutions which are established in all parts of the United Kingdom were supplied even tolerably with books; a very considerable reduction in their price would at once augment and improve the libraries of the Institutions, and, by so doing, increase their means of attraction, their number of members, and their funds applicable to the purchase of books. To encourage a taste for reading is to multiply the purchasers of books.

The plan which the Council of this Society proposes to adopt is as follows:

1. The Institutions in union with the Society will send in to the Society monthly (say by the 15th of each month), a list of the books which they wish to purchase.
2. The orders will be given wholesale to the publishers or booksellers by the Society monthly (say on the 19th of each month).
3. The publishers or booksellers will deliver the book, carriage paid, monthly (say the last day of the month), at the Society's office, or at the Society's Agents, as the Society may determine.
4. Payment will be made by the Society on the delivery of the goods.

I am directed to request, that if you are disposed to enter into such an arrangement as this, you will be so good as to inform me, before the 1st of June next, what reduction per cent. from the selling price you will be willing to make to the Society for its united Institutions, upon, 1st, The whole of your own publications; 2nd, Publications not your own. For the sake of simplicity, it is desirable that only two rates of reduction should be stated.

Whether you enter into the proposed arrangement or not, you on the one hand, and the Institutions on the other, will of course be perfectly at liberty to carry on direct dealings without the intervention of the Society.

I enclose a copy of the Society's Journal, which is published weekly, and sent gratis to every member of the Society, and to every Institution in Union. It is thought that it would be convenient to those publishers who may enter into the arrangement which I have described, if their names were published in this Journal, and their several rates of reduction were communicated to the Institutions. The publishers would then probably find it convenient to forward their priced catalogues to the Institutions, in order that they might know what books to purchase.

A List of the Institutions in Union would be supplied from time to time for this purpose.

I am, your obedient Servant,
EDWARD SOLLY, *Secretary.*

## LIVERPOOL MECHANICS' INSTITUTION.—INDUSTRIAL INSTRUCTION.

[*From the Liverpool Mercury.*]

TO THE WORSHIPFUL SAMUEL HOLME, ESQ., MAYOR OF LIVERPOOL.

Mount-street, 23rd May, 1853.

MR. MAYOR,—I observe in the *Albion* newspaper of this morning a letter addressed to your Worship by the Principal of the Collegiate Institution, on the subject of Industrial Instruction; and as public attention is again, and through another channel, emphatically called to the question, I think I should not be discharging my duty to the Institution I am privileged to serve, if I failed to submit to your notice, without further delay, the steps which have been already taken, and the proceedings which are immediately contemplated, by the Directors of the Mechanics' Institution in regard to this important movement.

In order to show you that the attention of the Board has, for some time past, been closely directed to the means of providing superior facilities for the education of the great mass of the people engaged in commerce and in the mechanical arts, I need only refer your Worship to the Report adopted at the Annual Meeting of the Members of this Institution, held on the 9th March last, from which the following is an extract:

> During the last year a very important measure has been carried into effect; namely, the union of the great body of provincial Institutions with the Society of Arts in London, of which his Royal Highness Prince Albert is President. This union now consists of 268 Institutions, including the Liverpool Mechanics' Institution, and its object is to afford to those widely-scattered establishments the utmost attainable facilities for the prosecution of all objects possessing a common interest, by means of an efficient and influential agency in London. Through this channel several important gifts have already been obtained for the library, and the Directors cannot doubt that benefits of the most important character are yet destined to flow from it.
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> The Society of Arts—the parent, it will be remembered, of the great Industrial Exhibition of 1851—has lately appointed a Special Committee from its Council to consider the question of industrial instruction, and to negociate with the Government and the various educational establishments throughout the country, with the view of procuring measures to be adopted to secure to the great body of the people, not merely a better and more practical general education than is usually afforded in public schools, but such special kinds of instruction as are so eminently necessary to enable the different classes of artisans to prosecute their several callings with due efficiency and success. The Directors have had various communications on this important subject with this Committee of the Council of the Society of Arts, in reference to the day-schools as well as to the evening department. They are glad to find that her Majesty's Government is expected to move in this matter during the present session of Parliament; and they need hardly say that they have considered it to be their duty to assure the Committee of the Council of the Society of Arts of their most cordial co-operation and sympathy with this movement.
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> It was for the purpose of affording to all classes of the community, and to young and old alike, the means of acquiring an education of that peculiarly real and practically useful character which is now not inaptly termed industrial instruction, that the Liverpool Mechanics' Institution was established twenty-eight years ago; and it has been in promotion of this primary object that all subsequent measures in connection with it have been adopted. In struggling for the accomplishment of its object, much has undoubtedly been effected by the Institution, although much more still remains to be done. There is no other Institution of this kind in the country which can boast of having afforded systematic instruction in its several schools to about 11,000 individuals within the comparatively short period of eighteen years; and if its progress in some sense has only been from difficulty to difficulty, it cannot but be gratifying to its friends and supporters to feel that efforts such as theirs, instead of being regarded with suspicion and distrust, are now considered identical with the common weal, and are appreciated as worthy of the co-operation and support of a liberal and enlightened Government.
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> The Board of Directors must not be understood, however, from the tenour of these remarks, to be in favour of any scheme for converting such establishments into schools to be managed or controlled by the Government. On the contrary, they believe that such a change would prove in the highest degree injurious. There must be no interference with the independent action of those Institutions; they must be self-governing, and they must also be self-supporting. But it is quite possible, as the Directors believe, that the Government may do very much to encourage local efforts, and to stimulate to further exertions, without infringing these important principles, or compromising in any way the position or management of the Institutions. And it is precisely this which those who ought to have the best means of knowing seem to believe it to be the intention of the Government to attempt. If these anticipations are well-founded, and if Parliament shall assent to any plan for offering certificates, prizes, exhibitions, and scholarships, to be competed for by pupils after they have completed, in these Institutions, certain clearly-defined courses of study,—and if, in addition, a few lectureships can be instituted, for limited periods, to provide instruction in particular subjects, for which remunerative classes cannot at once be organised,—then the long-cherished idea of an Industrial College may be completely realised, and a range of usefulness opened for the Liverpool Mechanics' Institution both higher and wider than it has ever yet approached.
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> It will be for the Board of Directors now to be appointed to watch the proceedings of Parliament in reference to this most important question, and to take such steps as may be found necessary to secure to this Institution whatever advantage is to be gained from any legislation on the subject. There is no want under which our country suffers so seriously as the want of a widely-diffused system of really practical instruction; and, apart altogether from higher considerations, it may be truly said, that there is no question on which our future progress, even as an industrial community, so much depends, as the extent to which we may succeed in providing for the better education of the great body of our people. The fact is established beyond the reach of contradiction, that among the other nations in central and western Europe much greater attention has been bestowed than with us to secure for persons devoted to the mechanical and decorative arts especially, a suitable degree of training and instruction; and the consequence is, that, notwithstanding the enormous advantages we enjoy in our inexhaustible mineral wealth, and the indomitable energy of our people, these nations are, by reason of the superior intelligence of their workmen, already competing with us, with daily increasing success, in the production of articles for which they have to come to us for the raw material, and in the manufacture of which we have hitherto enjoyed a monopoly. Surely this is a state of matters which may not longer be regarded with indifference; for, as sure as the struggle has commenced, it will become daily more severe, and that nation can alone be ultimately most successful which shall most earnestly apply itself to the cultivation of knowledge and refinement.

Since that period this important subject has been diligently prosecuted by the Board of Directors. A correspondence was opened immediately after the above date with the Department of Practical Science and Art in connection with the Board of Trade; and on Tuesday last Dr. Lyon Playfair visited Liverpool, at the request of the Directors, when he inspected the several schools connected with this Institution, and when the leading features of a comprehensive scheme for the accomplishment of the objects in view were fully discussed, and all but definitely arranged.

It is well known to the public of Liverpool, that in the schools connected with the Mechanics' Institution a much more extended course of instruction in science has been afforded than was at all known in public schools at the time when they were established, or than is yet ordinarily admitted. In this respect, therefore, but little remains to be done; but the Directors are keenly alive to the great importance of affording an education of at once a higher and more practical character than can be given in any ordinary day-school, and they are now engaged in organizing a department for the reception of pupils who may be disposed to carry their studies further, and to offer extended courses of instruction in Applied Mathematics, including the various operations of accounting; in Physical Geography, including mineralogy and a knowledge of the available products of various countries; in Practical Chemistry, including commercial testing; in Political Economy, including commercial statistics and international law; in Mechanical Philosophy, including the arts of construction, the knowledge of materials, &c.; in Modern Languages; and in Free-hand Mechanical, Architectural, and Ornamental Drawing.

It is proposed to establish classes for these subjects as supplementary to the existing schools, and to add to the already extensive and valuable Museum belonging to the Institution such collections of raw produce and manufactured articles as may serve amply to illustrate the most comprehensive courses of practical instruction.

I regret that I am obliged to trouble your Worship with a reference to schemes which are in any degree immature; but I beg you to believe that the Directors of this Institution, relying upon the sympathy of their fellow-townsmen, which, during an experience of twenty-eight years, has never hitherto failed, will leave nothing unattempted in the establishment over which they preside which may be necessary to realise, in its fullest extent, the idea of a Commercial and Maritime Institute and School of Arts.

I have the honour to be, Mr. Mayor, your most obedient humble Servant,

W. NICHOL, *Secretary.*

The following reply has been received from his Worship:

TO W. NICHOL, ESQ., SECRETARY, MECHANICS' INSTITUTION.

Town-hall, Liverpool, May 24, 1853.

SIR,—I beg to acknowledge the receipt of your letter of yesterday, which I have read with unusual interest. I am obliged by the information which it contains, and shall endeavour to make myself master of the general subject to which it refers.

I have accepted an invitation from the Lord Mayor of London, to be present at the Mansion-house on the 7th of June, when the subject of Industrial Education will be considered by those most likely to furnish information, as well as by the Municipal representatives who will then be assembled.

Committed as our country is to a course of policy which has thrown down the gauntlet to the world, it is clear that we must instruct the community, and particularly our artisans, how they may best avail themselves of those advantages with which a beneficent Providence has endowed our land.

I am, Sir, your faithful and obedient Servant,

SAMUEL HOLME.

## HOME CORRESPONDENCE.

### LECTURES.

16, Granville-square, Pentonville, May 30th, 1853.

MY DEAR SIR,—The pressure of occupations which frequent absence from town during the last three months had compelled me to lay aside for a time, has only now left me leisure to make a few remarks in reference to the Lectures I have recently delivered at some of the Institutions in Union with the Society of Arts. I address these remarks to yourself, both because I am aware of the active interest you have felt in the formation of the Union, and because my own connection with it, in the task of lecturing, originated with yourself.

I have visited, since the early part of March last, twenty-two different provincial Institutions:—at widely scattered points, between Durham to the northward and Folkstone in the opposite direction. Some of these visits have been made at much personal inconvenience, and upon conditions in which I chiefly acquiesced from a strong desire to do my best towards carrying out the objects of the Union, and a determination to make the experiment of doing so in a liberal spirit.

On the whole (with one or two exceptions) the Lectures have been well attended:—in some cases very numerously, and in nearly all instances to an extent which appeared to meet the expectations of those engaged in managing the respective Institutions, who were of course better judges on this point than a stranger could be. Great attention has been paid to the lecture—an attention the more gratifying inasmuch as my subjects admitted of no adventitious means of exciting the interest of an audience, and had no other illustrative help than that derived from a few large maps and diagrams. I believe I may appeal to the experience derived from these visits in confirmation of the opinion that lectures which treat of scientific subjects, and which aim at being instructive, may yet be made popular and interesting. It might seem merely egotistical in *me* to make such appeal, were it not that in many instances a strong desire has been expressed that my visit should be repeated on a future occasion.

In regard to the numerical attendance upon lectures, very much depends (I am convinced) upon the average quality of the lectures that are delivered—much more than upon the merits of any one or two particular lectures. I mean, that if common-place and inferior lectures are customarily delivered, the entire matter of lectures falls into disrepute, and they become regarded as things of dull and prosy routine. I believe that the recommendation to have "*fewer* lectures, and *those better* ones" would embody the soundest advice that could be given to the great majority of Institutions. In this respect, I incline to think that the facility with which gratuitous lectures are obtainable by many Institutions has been productive of dis-service to the whole system of public lecturing. I could mention (were it not that I intentionally refrain from doing so) more than one Institution in which I have had reason to think such a result observable. In some such cases, it will (not unnaturally) be found that lecturing comes to be regarded as a matter of very ordinary description—a lecture being a thing that anybody can "get up" for the occasion, and that is at any time readily obtainable from Mr. A. or Mr. B., as the necessities of the case may demand. I feel considerable delicacy in expressing my opinion on this point, and for an obvious reason, though my doing so is dictated by no other than disinterested considerations.

I believe it to be, in many cases, a mistake to confine the lecture-session to so short a period of the year, and to crowd all the lectures within so brief a space. I know it is commonly said that the members will only come to the lectures during the winter months; but I doubt the fact. It may be so in the case of large towns, but I am convinced that it is not so in all instances. Only ten evenings since, I addressed a numerous and highly attentive audience at an Institution in Kent (Sevenoaks), and have undertaken to lecture there again in the course of the following month (June). At this Institution, they have a lecture at intervals of three weeks, all through the year: and the lecture-evenings, I am informed (and certainly my own limited experience corroborated it), are looked forward to with much interest. I incline to believe that a medium between this practice and that generally adopted (of limiting the lecture-session to the months between October and March) might be adopted with advantage in a great number of instances.

In the intercourse I have had with the secretaries and Committees of the Institutions I have visited, the conversation has naturally adverted, in most cases, to the Society of Arts, and the Union of which it constitutes the centre. I may state, as the general result of the impressions I have thence been led to form, that there appears to exist a strong desire that the Society of Arts should undertake the task of organisation (in reference both to the order and the subjects of Lectures) much more fully on future occasions than was done in the recent session. In more than one instance I have heard disappointment expressed, that of several subjects selected from the schedules issued by the Society, my own was the only one that had been productive of any result. I have pointed out that this seemed a necessary consequence of the fact, that such subjects had only been selected by isolated and distant Institutions, and that the terms of remuneration by which the selection had been accompanied had been inadequate to the purpose. But it has almost uniformly been replied, that other Institutions, in the neighbouring towns, would no doubt have readily (and gladly) acquiesced in an arrangement for the reception of the same Lecture on successive evenings, if the Society of Arts had intimated (at a period sufficiently in advance) a desire that such should be made. Or, in other words, if the Society of Arts had said to the Institutions in a particular locality, "Mr. A. or Mr. B. is prepared to visit you, to lecture on a certain subject, provided your own and certain neighbouring Institutions will agree to receive his Lectures on so many successive evenings," it would seem (judging from the conversations I refer to) that the arrangement might readily have been made. The three neighbouring Institutions of Warwick, Leamington, and Coventry, form a case in point. I visited Warwick merely to lecture *there*, and there only; but I was assured that there could be no possible reason why the three places should not receive the same Lecture on three successive nights, and that there would be no difficulty in carrying out such a scheme. A very general desire appeared to me to prevail, in similar cases, that the Society of Arts should take the initiative in making such arrangements.

How far the Society of Arts can go in such a matter, I do not know, nor do I stop to inquire. I merely record the impression which recent experiences have led me to receive, and I do so because I believe it may not be uninteresting to yourself and the gentlemen who have acted with you, and because I feel really interested in the cause you have taken up.

I must apologise for the length to which this letter has extended; and am, my dear Sir,

Yours faithfully,
WILLIAM HUGHES.

Harry Chester, Esq.

## PROCEEDINGS OF INSTITUTIONS.

ANNAN.—The Fifth Annual Meeting of the Members of the Mechanics' Institute, was held on Wednesday, April 27th. The Report of the Committee states, that there has been an increase of fifty during the past year, in the number of Life, Honorary, and Ordinary Members, but that there has been a falling off in the number of Apprentices and Lady Members; so that the absolute increase is only twenty-five. The library has been increased from 740 to 934 volumes, and the number of exchanges has been 4,695 against 3,848 in the preceding year. The average number of readers per quarter has been 173. The Committee attribute much of their present prosperity to the News-room in connection with the Institution, which has been opened about fifteen months. It is supplied with upwards of thirty papers in the week, and is well frequented. During the winter, a course of twelve lectures was delivered, which were better attended than in any previous year; and in addition to the winter course, the Rev. James Mackenzie, of Dunfermline, delivered two lectures upon "Rome in 1852." A Literary, Scientific, and Discussion Class, for the mental improvement of those who avail themselves of it, has been renewed with success. The Treasurer's statement of accounts show an income of 111*l.* 14*s.* 8½*d.*, and an expenditure of 89*l.* 19*s.* 9½*d.*; leaving a balance in hand, of 21*l.* 14*s.* 11*d.*

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

## MISCELLANEA.

MONUMENT TO SIR ISAAC NEWTON.—The Mayor and Town Council of Grantham propose to erect a statue of Newton, in an open space, at the south entrance to the borough. The statue will look towards the birth-place and home of the philosopher, which was within the ancient boundaries of the borough. The ground is already in preparation at the expense of the Town Council. The proposal has met with general approval, and has received the sanction of the Royal Society; and it is said a natural desire has been evinced that the undertaking should be worthily carried out, so as to make the statue a National Memorial.

The Museum of Ornamental Art at Marlborough House.—The numbers attending, &c., during the month of May, were as follows: 7,759 persons on the public days, and admitted free; 851 persons on the students' days, and admitted as students on the payment of 6d. each, besides the registered students of the classes and schools.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 24th, 25th, and 26th May*, 1853.

449. Harwich Election—Report from the Committee.
463. New Ross Election—Minutes of Evidence.
467. Harwich Election—Minutes of Evidence.
511. Dockyard Appointments—Report from Committee.
487. Schools—Returns.
501. Isle of Man—Return.
520. Committee of Selection—Eleventh Report.
345 (1). Tynemouth Election—Index to Minutes of Evidence.
398. Colonial Expenditure—Return.
461. Sugar, &c.—Return.
499. Library of the Legislative Council and Assembly of Canada—Copy of Letter.
500. Bills—Westminster Bridge.
510. „ —Succession Duty.
517. „ —Hackney Carriages (Metropolis), as amended in Committee, and on consideration of Bill as amended.

*Delivered on 27th May.*

191. Local Acts—Reports of the Admiralty.
470. Plymouth Election—Report from the Committee.
395. Sheriff Courts (Scotland)—Abstract Return.
301. Corn-grinding Machinery—Papers and Correspondence.

*Delivered on 28th and 30th May.*

498. Dr. Reid—Return.
412. Convicts and Convicted Misdemeanants—Abstract of Returns.
399. Presbyterian Church (Ireland)—Correspondence.
479. Indian Territories—Second Report from Committee.
261. Civil Services Estimates—General Abstract.
382 (1). Athlone Election—Index to Minutes of Evidence.
506. Metropolis Turnpike Roads—Twenty-seventh Report of Commissioners.
526. Committee of Selection—Twelfth Report.
529. Dockyard Appointments—Copy of an Order in Council.
527. Bill—Copies of Specifications Repeal.
Turnpike Trusts—Reports of the Secretary of State.
Public General Act, Cap. 16, 17, 18, 19, 20, 21, 22, 23, 24, and 25.

*Delivered on 31st May.*

434. Small Pox and Vaccination—Copy of Letter, &c.
512. Public Health Act—Return.
523. Sheeps' Wool, &c.—Returns.
532. Hackney Carriages (Metropolis)—Return.
536. Select Committees—Return.

*Delivered on 1st June.*

497. Plymouth Election—Minutes of Evidence.
535. Bill—Battersea Park.
Census of Great Britain, 1851—Population Tables, Vol. I.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

### *From Gazette, 27th May, 1853.*

*Dated 14th April*, 1853.

905. T. Haigh—Cleansing-pans, &c.

*Dated 19th April.*

943. F. H. Smith—Cleansing tubular boilers, &c.

*Dated 21st April.*

959. T. Dunn—Steam-boilers, &c.

*Dated 23rd April.*

981. H. Houldsworth—Combing cotton, &c.

*Dated 28th April.*

1029. J. Hetherington—Combing cotton, &c.

*Dated 6th May.*

1113. T. Murray—Machine for hoeing, cutting, &c., turnips, &c.

*Dated 11th May.*

1155. J. Brett—Electric telegraph. (Partly a communication.)
1157. S. C. Lister—Treating wool, &c., previous to spinning.
1159. H. P. Burt—Portable houses.
1161. J. Mottram—Washing ores, &c.
1163. J. Bottomley—Textile fabrics.
1165. A. Bird—Communication between guard and driver.
1167. E. Whittaker and J. Walmesley—Manufacture of pipes, tiles, &c.
1169. G. Bell—Liquid cement and pigments.
1170. A. Matthews—Disengaging boats from ships.
1171. W. Bull—Direct acting steam-engines.

*Dated 12th May.*

1173. J. Parkes—Stop-cock for gases.
1175. J. Denton—Machinery for looped fabrics.
1177. J. Bernard and E. T. Bellhouse—Pressing and extracting fluids.

*Dated 13th May.*

1178. C. Pooley—Feeding-machines, for opening, cleaning, &c., cotton, &c.
1179. J. S. Eidmans—Umbrellas, &c.
1180. J. Arrowsmith—Turntable.
1181. G. Bertram—Paper manufacture.
1182. G. Stiff—Paper-machine.
1183. W. Thomas—Weaving narrow fabrics for binding.
1184. C. Tetley—Rotatory engines.
1185. R. S. Bartlett—Sewing-machines.
1186. R. A. Brooman—Hats. (A communication.)
1187. E. T. Bellhouse—Steam boilers.

*Dated 14th May.*

1189. R. Eades—A metallic wheel.
1190. G. F. Russell—Disengaging ship's boats.
1191. G. Coppock—Looms.
1192. J. Browne—Construction of chimnies, and apparatus for consuming smoke, &c.
1193. J. Higgin—Printing and dyeing, and substances used.
1194. T. S. Holt—Steam-engines.
1195. M. Poole—Machine for pegging boots and shoes. (A communication.)
1196. H. D. Mertens—Preparation of materials for making beer, &c. (A communication.)
1197. W. J. Warner—Dry gas-meters.
1198. F. M. Jennings—Softening and improvement of wool, silk, feathers, &c.
1199. J. O'Keefe—Watch-cases.
1200. S. Garrett—Preparing and tanning skins, &c.
1201. P. A. Le Fontaine-moreau—Steam-engines. (A communication.)
1202. P. A. Le Fontaine-moreau—Steam-boiler. (A communication.)
1203. J. D. Brady—Knapsacks.
1204. R. W. Swinburne—Machinery for glass manufacture.
1205. E. Rolt—Pianofortes.

*Dated 16th May.*

1206. J. J. J. Jamin—Boots and shoes.
1207. J. E. Barse—Grease for lubricating.
1208. T. Richardson—Manufacture of compounds containing phosphoric acid.
1209. R. Boyd—Weaving.
1210. W. S. Tizard—Dredging-machines.
1211. M. H. Phillips—Gun.
1212. G. Jones—Ventilating mines.

*Dated 17th May.*

1214. C. J. Pownall—Preparation and treatment of flax, &c.
1215. J. L. Stevens—Grates and stoves.
1216. J. Webb—Rotatory engines.
1217. J. T. G. Vizetelly and H. R. Vizetelly—Printing-machines. (A communication.)

*Dated 18th May.*

1220. C. Cowper—Combing wool, &c. (A communication.)
1222. J. Haskett—"Ferdinand Martin safety-anchor." (A communication.)
1224. W. Rye—Kitchen ranges.
1226. R. Thompson—Making perforated building stone.
1228. J. Barsham—Drying bricks, &c.
1230. E. T. Simpson—Manufacture of manure.
1232. W. Gossage—Alkali from common salt.
1234. B. Newton—Mats.
1236. E. Briggs—Pile fabrics, and machinery for same.

### WEEKLY LIST OF PATENTS SEALED.

*Sealed 26th May*, 1853.

Year, 1852.

889. George Augustus Huddart, of Brynkir, Caernarvonshire—Invention of an improved manufacture of artificial flies.

*Sealed 27th May*, 1853.

891. Henry Winton, of Dove-mills, Cleveland-street, Birmingham, and Francis Parkes, of Sutton Coldfield Park, Warwick—Improvements in the manufacture of agricultural and horticultural forks, and pronged or toothed instruments and hoes.

928. William Morris, of Westminster—Improvements in the production of motive power, and in apparatus pertaining thereto.
983. John Henry Johnson, of 47, Lincoln's-inn Fields, and Glasgow—Improvements in weaving carpets and other fabrics, and in the machinery or apparatus employed therein. (A communication.)
1027. William Sorrell, of Kingsland—Improvements in furnaces and fireplaces for consuming smoke.
1061. Phillippe D'Homme, of Paris—Improvements in the manufacture of window-blinds, curtains, and hangings. (A communication.)
1138. Thomas Vicars, senior, and Thomas Vicars, junior, of Liverpool—Improvements in baking-ovens and apparatus for placing the bread, biscuits, or other articles to be baked therein.

Year, 1853:
127. John Sheringham, of 24, Edwardes-square, Kensington—Improvements in stove-grates.
151. Abraham Anton Meijsenheijm Knipschaar, of the Hague—Invention of an illuminated night clock.
380. Charles John Burnett, of Edinburgh—Improvements in apparatus or mechanism for driving machinery through the agency of water.
427. Charles Kinder, of Chesterfield—Improvements in mantel or chimney-pieces.
487. Joseph Brandeis, of Great Tower-street—Improvements in the manufacture and refining of sugar.
544. John Hinks and George Wells, of Birmingham—Invention of a new or improved metallic pen.
575. Augustino Carosio, of Genoa, now of Montague-street—Invention of an hydrodynamic battery, or new or improved electro-magnetic apparatus, which, with its products, are applicable to the production of motive-power and of light and heat.
662. John Bottomley, of Bradford, Yorkshire—Improvements in the manufacture of figured or ornamented, piled, or plushed fabrics.
702. Nicholas G. Norcross, of Lowell, Massachusetts, United States of America—Improvements in machinery for planing or reducing boards or timber.
735. David Stephens Brown, of 2, Alexandrian Lodge, Old Kent-road—Improvements in engines to be worked by steam, or any other elastic fluid, which invention also includes the apparatus for generating such steam or other elastic fluid.
741. George Edward Dering, of Lockley, Hertford—Improvements in the manufacture of certain salts and oxides of metals.
771. Joseph Rylands, of Kingston-upon-Hull—Improvements in yards and spars of ships and other vessels.
775. George Fergusson Wilson and James Freeman Lee, of Belmont, Vauxhall—Improvements in the manufacture of night-lights and their cases.
776. George Fergusson Wilson, of Belmont, Vauxhall—Improvements in treating certain oily matters, and in the manufacture of oil.
779. William Crofts, of Derby-terrace, Nottingham Park—Improvements in weaving.
783. George Fergusson Wilson, of Belmont, Vauxhall—Improvements in the manufacture of cloth, and the preparation of wool.
784. George Fergusson Wilson, of Belmont, Vauxhall—Improvements in treating certain greasy matters, and in the manufacture of candles.
785. George Fergusson Wilson, of Belmont, Vauxhall—Improvements in the manufacture of night-lights, and in apparatus to be used therewith.
799. Jesse Ross, of Victoria-terrace, Keighley, and Thomas Robert Hafford Ross, of 73, New-walk, Leicester—Improvements in machinery or apparatus for combing wool, cotton, silk, flax, and other suitable fibrous materials.
804. Charles May, of 3, Great George-street, Westminster—Improvements in machinery for manufacturing and rolling iron.
836. William Henry Wells, Edward Mann, and John Harman, of Wandsworth—Improvements in grinding wheat and other grain.
840. Frederick Le Mesurier—Improvements in apparatus for measuring and indicating a given period of time.
842. Christopher Nickels, of York-street, Lambeth—Improvement in machinery for masticating, kneading, or grinding India-rubber, gutta percha, and other matters.

*Sealed 28th May*, 1853.

Year, 1852:
905. Matthew Samuel Kendrick, of Birmingham—Improvements in grates and fireplaces.
906. Matthew Samuel Kendrick, of Birmingham—Improvements in lamps and burners, and in the apparatus to be used therewith.
912. William Jeffs, of Hulme, near Manchester—Improvements in manufacturing letters, figures, and ornamental work, and in the mode of attaching the same to wood, stone, iron, and certain other materials.
914. James Mayelston Haldon, of Lime-street, City—Improvements in the means of rendering wood imperishable and uninflammable. (A communication.)
922. Andrew Edmund Brae, of Leeds—Invention of an apparatus for stopping and detaining, or releasing and setting free, cords, tapes, chains, ropes, or other flexible lines or strings.

*Sealed 31st May*, 1853.

923. Charles Hart, of the Vale of White Horse Iron-works, Wantage—Invention of a thrashing, straw-shaking, riddling, and winnowing-machine combined.
925. George Augustus Huddart, of Brynkir, Caernarvonshire—Improvements in the construction of boilers and furnaces for generating steam.
926. Charles Walker, of Heap Bridge, near Bury, Lancashire—Improvements in the method of purifying water for steam-boilers and other purposes.
930. John Dable and William Wells, of Birmingham—Improvements in rolling metals.
937. Ebenezer Poulson, of Monkwearmouth, Durham—Invention of an improved mechanical purchase, applicable to working ships' and other pumps, and to similar purposes.
957. John Rowbotham, of Manchester—Improvements in time-keepers and apparatus connected therewith, for ascertaining the attendance on duty of watchmen and other persons having charge of property. (A communication.)
967. Richard Archibald Brooman, of 166, Fleet-street—Improvements in sawing and saw-mills. (A communication.)
989. Richard Archibald Brooman, of 166, Fleet-street—Improvements in safety-valves. (A communication.)
997. William Baddeley, of 13, Angel-terrace, St. Peter's, Islington—Improvements in apparatus for the conversion of rectilinear into circular motion. (A communication.)
1021. Julien Boilesve, of 4, South-street, Finsbury—Invention of an improved desiccating apparatus. (A communication.)
1089. Frederick Joseph Bramwell, of Millwall—Improvements in steam-engines.
1169. John Frederick Gordon, of Strangford, County Down, Ireland—Invention for facilitating the turning of four-wheeled carriages, and bringing the front and hind wheels nearer to each other, entitled, "The Caster Axle."

Year, 1853:
449. William Wilkinson, of Nottingham—Improvements in the manufacture of ropes, bands, straps, and cords.
796. William Edward Newton, of 66, Chancery-lane—Improvements in producing plates or surfaces which may be used as printing or embossing surfaces, or as door-plates, dials, or number-plates, or other plates or surfaces, bearing inscriptions or devices of various kinds. (A communication.)
798. Robert William Sievier, of Upper Holloway, and James Crosby, of Manchester—Improvements applicable to looms for the manufacture of textile fabrics.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| May 25 | 3465 | A Camera. | T. Ottewill | 24, Charlton-terrace, Barnsbury-road. |
| " 26 | 3466 | Improved Apparatus to assist the Fly to take off the Fibre from the rollers of Spinning-machines. | George Turner and Thomas Mitchell | Bradford, Yorkshire. |
| " 31 | 3467 | Gas-burner. | R. W. Winfield | Birmingham. |
| " " | 3468 | Throttle-valve. | Mills and Whittaker | Oldham. |
| " " | 3469 | Improved Knapsack. | John Drumgoole Brady | Cambridge-terrace, Hyde p |
| June 1 | 3470 | "The Area Protecs," forming a Box or Packing-case, and, with the supporting posts, a House for Emigrants, &c. | John George Reynolds | 22, Anderson's-buildings, Remington-street, City-road. |

# SOCIETY OF ARTS.

**FRIDAY, JUNE 10th, 1853.**

## GENERAL MEETING,

*Wednesday, June 8th*, 1853.

The General Meeting to receive the Report of the Council relative to their Proceedings during the past year, and the Auditors' Statement of Accounts, was held on Wednesday, the 8th inst., Capt. H. Cunliffe Owen, R.E., in the chair.

The following were elected Members:

Best, Hon. and Rev. Samuel, Andover.
Broad, C. W., Dover.
Clark, Rev. Samuel, Battersea.
Dawbam, George, Wisbeach.
Duckworth, William, 38, Bryanston-square.
Freer, Rev. R. Lane, Hereford.
Gallsworthy, John, Gresham Club.
Greig, Sir Hector, Brompton.
Herring, Thomas B., Finchley.
Hollier, Elliot, Dudley.
Hume, William Burnley, Trinidad.
Jackson, Samuel, Red Lion-street.
Peake, Rev. J. Room, Whitchurch.
Reynolds, J. S., Hampstead.
Skey, Dr., 9, Hertford-street.
Tapp, T. Berrett, Hertford.
Webb, T. Bellamy, Lincoln's-inn.

The following Institutions have been taken into Union since the last Meeting:

270. Dudley, Mechanics' Institution.
271. Camberwell, Literary and Scientific Institution.
272. Whitchurch (Salop), Mechanics' Institute.

### REPORT from the Council to the Society on the close of the Ninety-ninth Session.

In compliance with the Rules of the Society, the Council have now the pleasure of meeting the members at the close of the Session, and of laying before them a brief Report of the transactions of the past year,—a duty which they perform with all the more satisfaction, as they feel that they may with reason congratulate the members on the increased power and utility of the Society.

The General Union of Country Institutions, formed rather more than twelve months since, and which was mentioned in the last Annual Report as then including 71 Institutions, has continued steadily and gradually to increase, and now numbers 270 of the chief local Institutions in the country. Though in fact still far from fully organised—a work which must evidently be one of time and experience—the Union has already sufficiently shown the practical value and utility of such an extended system of co-operation, and has led to many results of the greatest importance. On the 9th inst. the Representatives of these Institutions will meet, for the first time, as a Committee, to consider and discuss on the best mode of carrying on the operations of the Union in future. The Council refrains from entering into further particulars, because a detailed Report of the proceedings of the Institutes' Committee during the past year will be laid before this meeting, and published in the Society's Journal.

A very important change has been made in the form and mode of publication of the weekly proceedings, the Council having, after due consideration, determined on the regular publication of a Weekly Journal, which should at the same time include reports of the ordinary meetings of the Society, the proceedings of Committees, correspondence, and memoranda respecting all subjects coming within the range of the Society's operations. In some respects this change has been attended by most valuable results; and from the more varied character of the publication, and its regular appearance once a week, it has gradually become an organ of considerable importance; so that the Council feel fully justified in continuing its publication, and may perhaps even endeavour still further to extend and improve it. As a means of disseminating the information collected by the Society; as an organ for acquainting the members with the proceedings and reports of particular meetings and Committees; and as a medium of communicating with the associated Institutions and their members, the Journal has already proved to be of much value. The Council hope that the organ of corrrespondence thus offered to practical men will be frequently made use of by the members, because, bearing in mind the very large circulation which the Journal commands, it is evidently a most excellent medium both for collecting and for disseminating information. Its utility as an organ of technical correspondence will probably be more fully appreciated when the members become more accustomed to its appearance.

The alterations which were decided upon respecting the locality and nature of the East Indian Exhibition, and the reasons which led the Council to abandon their original plan of holding the Exhibition in London, have already been stated to the Society. It is enough now to say, that the result has fully proved the wisdom of the suggestion of the Royal President which led to this determination; and that the hearty co-operation with which the Council was met by the executive of the Dublin Exhibition, whilst it tended to render the East Indian collections more practically valuable and instructive than they would have been as an isolated Exhibition, at the same time satisfactorily showed that the desire of the Council to aid the Dublin Exhibition was both understood and appreciated. The labours of the Indian Exhibition Committee were most handsomely responded to; and the gracious contributions of Her Majesty; the valuable and unique collections sent over by the Government of the Netherlands; the rare and interesting articles lent by the Hon. the East India Company; and the numerous selections of Eastern articles kindly lent by the Royal Asiatic Society, the United Service Museum, the Marchioness of Headford, Lord Gough, Mr. Reeves, Mr. Twining, Colonel Sykes, Mr. Bonner, Mr. Downing, Mr. Bridge, Dr. Wallich, Mr. Prideaux, Mr. Rothsay, Messrs. Hewitt, and others, have together constituted the Eastern Court of the Great Dublin Exhibition one of the most interesting parts of the whole collection. The selections from the Royal Museum of the Netherlands, graciously entrusted to the Society, and sent over to Ireland under the especial charge of M. Van de Kasteele, are of peculiar value, and serve to illustrate the habits and customs of the people of Japan in a very remarkable manner.

The Second Report of Her Majesty's Commissioners for the Great Exhibition of 1851, involving as it did many questions of the highest value, received the careful consideration of the Council, who appointed a Committee to ascertain in how far the Society was in a position to carry out those suggestions in the Report which seemed most nearly to come within the legitimate province of the Society, and which the Report itself clearly indicated it was best fitted to undertake. The Council believed that the trade and commerce of the country might be materially aided by the formation of a great Industrial Museum, as suggested in that Report; and though they would have hesitated to take upon themselves the formation of so large a Museum, they conceived that they could well aid in the further development of the plan put forth by the Commissioners, by collecting some of the necessary information and specimens which such a Museum must contain. They therefore proposed to the Royal Commissioners to undertake, conjointly with them, the formation of a collection of animal raw produce and manufactures, as the first step towards carrying out the more comprehensive plan of the Commissioners, and as the commencement of a future Trade Museum. This proposal was fully approved by the Royal Commissioners, and the duty of carrying it out has been confided to Professor Solly, who, on accepting the charge of this special collection, and the correspondence to which it will necessarily lead, expressed to the Council a wish not to be again put in nomination as Secretary at the coming election in July next.

The Report of the Royal Commissioners, and the suggestions which it contained, likewise induced the Council to appoint a Committee to collect information respecting the present state of Industrial Education, and the alterations in the modes of teaching at present adopted which might appear desirable. The Report of this Committee, recently presented to the Council, embodying as it does the experience of a large number of the leading manufacturers, clergymen, schoolmasters, and friends of education generally, is of much practical value, and will shortly be published.

Besides the Eastern Exhibition already referred to, two special Exhibitions have been held during the past session—one of recent patented and registered inventions, and one of photography. The former, constituting the fourth annual exhibition of inventions which has now been held by the Society, included nearly 200 articles, contributed by 120 exhibitors. Of the value of these yearly collections, in illustration of the progress of invention, it is quite unnecessary to speak. The Photographic Exhibition held last December, as the first public attempt to collect together examples of the various processes employed in this new and very interesting art, has already produced important results, by drawing the attention of the public to the rapid advances which have of late years been made, and the great capabilities which the art possesses; whilst the discussions to which it gave rise, and the comparison of different modes of taking pictures, and the various kinds of apparatus employed, are every day leading to new discoveries and improvements. Great advances may also be expected from the labours of the recently-formed Photographic Society; and the Council have therefore felt pleasure in offering to them the use of the meeting-room, and such other facilities as could be afforded.

The members will have observed with interest the gradual development of the spirit of industrial emulation and comparison, which is everywhere becoming apparent in the announcement of Exhibitions. The Council have lost no opportunity of aiding these Exhibitions; and they have recently appointed a special Committee for the purpose of promoting the due representation of British manufactures at the approaching Universal Exhibition in Paris in 1855.

The Prize-list of the present session has produced many valuable communications, which have been referred to the various standing Committees for consideration and report. Some of these—namely, the papers of Messrs. Claudet, Stones, Blackwood, Mordan, Denison, Kingsley, and Wenham, have been read at the Wednesday evening meetings; and others, which it was not possible to bring before the Society in this manner, have been recommended for reward, and will therefore receive such distinctions as they are considered entitled to at the approaching distribution of prizes and rewards. The Prize-list for the ensuing session has been very carefully revised, and will shortly be issued.

The financial position of the Society has been already explained by the Auditors' Statement of Accounts, circulated amongst the members at the commencement of the present month. It may be here stated that the income has increased from 2,883*l.* 5*s.* 11*d.* in 1852, to 3,909*l.* 9*s.* 2*d.* in 1853.

The number of new members who have been elected during the session is 327, whilst during the same period the Society has lost 10 members by death, and 55 have left the country, or withdrawn for other reasons; making the total increase of members during the past year 262.

By order of the Council,

E. Solly, *Secretary.*

## THE CONFERENCE.

The Second Annual Conference between the Representatives of the Institutions in Union and the Council of the Society of Arts, was held on Thursday, the 9th instant, at eleven o'clock. A.M. The Chairman of the Council, Henry Cole, Esq., C.B., in the chair.

The following Members of the Council attended: the Rev. Dr. Booth, F.R.S., Mr. Harry Chester, Mr. Warren De la Rue, F.R.S., Captain Owen, R.E., Dr. Lyon Playfair, C.B., Capt. Eardley Wilmot, R.A., and Mr. Winkworth.

The following Members of the Institutes' Committee, not members of the Council, also attended: Mr. R. D. Grainger, F.R.S., Mr. MacDonald, and Mr. Redgrave.

The following is a List of the Institutions represented at the Conference, and of the names of the respective Representatives:

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| Aberdeen, Mechanics' Institution | Mr. Alexander Bain. |
| Alton (Hampshire), Mechanics' Institution | Mr. Charles Stewart. |

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| Annan, Mechanics' Institute | Mr. Wm. Ewart, M.P. |
| Ashbourn, Literary Institute | Mr. John W. Lister. |
| Ashford, Mechanics' Institute | Mr. Henry Whitfield. |
| Aylesbury, Mechanics' Institution. | Dr. Lee. |
| Basingstoke, Mechanics' Institute | Mr. F. W. Bushell. |
| Bath, Athenæum . . . . . | Mr. J. Shenstone. |
| Battersea, Literary and Scientific Institution | Mr. J. C. Buckmaster. |
| Battle, Mechanics' Institution | Mr. Horace Martin. |
| Bedford, Literary and Scientific Institution. | Mr. James Coombs. |
| Bexley Heath, Society for the Promotion of Useful Knowledge | Mr. Flaxman Spurrell. |
| Bicester, Literary Institution and Mutual Improvement Society | Mr. Johnson, F.R.A.S. |
| Blandford, Institution . . . | Mr. F. H. Bastard. |
| Boston, Athenæum . . . . | Mr. J. W. Bontoft. |
| Braintree and Bocking, Literary and Mechanics' Institution | Mr. G. Courtauld. |
| Brentford, Literary and Scientific Institution | Rev. F. Thompson, B.A. |
| Brighton, Athenæum and Young Men's Literary Union | Mr. W. Coningham. |
| Brighton, Mechanics' Institute | Mr. Henry S. Turrell. |
| Bristol, Athenæum . . . . | Mr. Edward Halsall. |
| Bromley, Literary Institute . | Mr. Samuel P. Acton. |
| Cambridge and Cambridgeshire, Mechanics' Institute | Mr. H. Harris (Mayor). |
| Carlisle, Literary, Scientific, and Mechanical Institution | Mr. J. Ferguson, M.P. |
| Carmarthen, Literary and Scientific Institution | Mr. D. Morris, M.P. |
| Chatham, Rochester, Stroud, and Brompton, Mechanics' Institute | Mr. G. D. Banes. |
| Chelmsford, Literary and Mechanics' Institution | Mr. W. W. Duffield. |
| Cheltenham, Literary and Philosophical Institution | Mr. Samuel Higgs Gael. |
| Chichester, Literary Society and Mechanics' Institution | Mr. H. W. Freeland. |
| Coggeshall, Literary and Mechanics' Institute | Mr. M. Gardner. |
| Cork, Royal Institution . . | Mr. Wm. C. Logan and Mr. R. I. Leeky. |
| Crieff, Mechanics' Institution | Mr. James Maxtone. |
| Deptford Institution . . . | Mr. W. S. Veness. |
| Derby, Mechanics' Institution | Mr. Thomas Madeley. |
| Devonport, Mechanics' Institute | Mr. Isaiah C. Radford. |
| Dover, Museum and Philosophical Institution | Rev. William Yate. |
| Dudley, Mechanics' Institution | Mr. Elliott Hollier and Mr. S. H. Blackwell. |
| Dunmow, Literary and Scientific Institution | Mr. W. I. Clayton. |
| Durham, Mechanics' Institute | Mr. J. Bramwell (Mayor) |
| Eastbourne, Literary Institute | Mr. A. Whiteman. |
| Epsom and Ewell, Literary and Scientific Institution | Mr. A. O'Brien Jones. |
| Falkirk, School of Arts . . | Mr. R. W. Kennard. |
| Falmouth, Mechanics' Institute | Mr. W. K. Norway. |
| Gateshead, Mechanics' Institute | Mr. W. Hutt, M.P. |
| Grantham, Philosophical Institution | Mr. Thomas Winter. |
| Grantham, Public Literary Institution | Mr. J. Hancock, and Mr. Bushby. |
| Gravesend and Milton, Mechanics' Institute | Mr. R. Nelms. |
| Greenwich, Useful Knowledge Society | Dr. Prior Purvis. |
| Guildford, Institute. . . . | Mr. E. W. Martin. |
| Hailsham, Mutual Improvement Society | Dr. J. M. Cunningham. |
| Hastings, Mechanics' Institution | Mr. John Banks. |
| Hereford, Philosophical Antiquarian, and Lit. Society | The Ven. Archdeacon, R. L. Freer. |
| High Green, near Sheffield, Mechanics' Institution | Mr. Geo. Chambers. |
| Hertford, Mutual Instruction Society | Mr. Thomas B. Tapp. |
| Holmfirth, Mechanics' Institution | Mr. John Hixon and Mr. J. Beardsill. |
| Huntingdon, Literary and Scientific Institution | Rev. J. H. Millard, and Rev. R. Haworth. |
| Hythe, Reading Society . . | Mr. H. B. Mackeson. |
| Ipswich, Mechanics' Institute | Mr. T. S. Gowing. |
| Lancaster, Mechanics' Institute | Mr. Thomas Storey. |
| Leeds, Mechanics' Institution and Literary Society | Mr. James Kitson, and Mr. W. J. Traice |
| Leeds, Yorkshire Union of Mechanics' Institutes | Mr. Edw. Baines, and Mr. James Hole. |
| Leicester, Mechanics' Institution | Mr. J. F. Hollings. |
| Lewes, Mechanics' Institution | Mr. Burwood Godlee. |
| Limerick, Literary and Scientific Society | Mr. Wm. Lane Joynt. |
| Lincoln and Lincolnshire, Mechanics' Institute | Mr. Jas. Hitchins, and Mr. James Snow. |
| Liverpool, Mechanics' Institution | Mr. W. Nichol. |
| „ Collegiate Institution | The Rev. J. Saul Howson, M.A. |
| London, The Bank of England Library and Literary Association | Mr. Matthew Marshall. |
| „ Camberwell Industrial Institution | Mr. H. Allport. |
| „ Camberwell Literary and Scientific Institution | Mr. D. Stewart Dykes. |
| „ Hackney Literary and Scientific Institution | Mr. George Offor. |
| „ Jews' and General Literary and Scientific Institution | Mr. M. S. Oppenheim. |
| „ Kingsland, Dalston, and De Beauvoir Town Literary and Scientific Institution | Mr. D. Grant. |
| „ London Domestic Mission Society | Mr. J. M. Wade. |
| „ London Mechanics' Institution | Mr. Samuel Vallentine, and Mr. A. M'Farlane. |
| „ Marylebone and Paddington Literary Institution | Mr. J. S. Hattersley. |
| „ Walworth Literary and Scientific Institution | Mr. J. S. Noldwritt. |
| „ Westminster Literary, Scientific, and Mechanics' Institution | Mr. Thomas Smith. |
| Longton, Athenæum and Mechanics' Institution | Mr. S. P. Goddard. |

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| Loughborough, Literary and Scientific Society | Rev. Henry Fearon. |
| Lymington, Literary Institution | Mr. A. W. Beetham. |
| Lynn, Conversazione and Society of Arts | Mr. Henry Edwards. |
| Macclesfield, Society for the Acquirement of Useful Knowledge | Mr. John Brocklehurst, M.P. |
| Manchester, Institutional Association | Dr. J. W. Hudson. |
| Margate, Literary and Scientific Institution | Dr. G. Yeates Hunter. |
| Modbury, Institution . . . | Mr. John Andrews. |
| Morpeth, Mechanics' and Scientific Institution | Mr. Matthew Soulsby. |
| Newbury, Literary Institution | Mr. Henry Godwin. |
| Newport, Monmouthshire, Athenæum and Mechanics' Institute | Mr. W. M. Jack. |
| Northampton, Mechanics' Institute | Mr. John Becke. |
| Norwich, Young Men's Institute | Rev. A. B. Power, M.A. |
| Nottingham, Mechanics' Institution | Mr. Arthur Morley |
| Oldham, Lyceum. . . . . | Mr. W. J. Fox, M.P. |
| Pendleton, Mechanics' Institution | Mr. Joseph Ashworth. |
| Peterborough, Mechanics' Institution | Rev. William Strong. |
| Portsmouth and Portsea, Literary and Philosophical Society | Mr. R. F. G. Smith. |
| Rawtenstall, Mechanics' Institution | Mr. John B. Whitehead. |
| Reading, Literary, Scientific, and Mechanics' Institution | Mr. James Boorne. |
| Reigate, Mechanics' Institution | Mr. Thomas Martin. |
| Romford, Literary and Mechanics' Institution | Rev. W. T. Jones, M.A. |
| Royston, Mechanics' Institute | Mr. John Warren. |
| St. Just, near Penzance, Institution | Mr. C. E. Trezise. |
| St. Leonard's, Mechanics' Institution | Mr. Alfred Burton. |
| Salisbury, Literary and Scientific Institution | Mr. Newell V. Squarey. |
| Saltash, near Plymouth, Institute | Mr. J. Williams, jun. |
| Sevenoaks, Literary and Scientific Institution | Mr. George Franks. |
| Shelton, Potteries Mechanics' Institution | Mr. Smith Child, M.P. |
| Shrewsbury, Church of England Literary and Scientific Institution | Mr. R. A. Slaney. |
| Southam, Mutual Improvement Society | Mr. H. L. Smith. |
| Southampton, Polytechnic Institution | Mr. H. Pond. |
| Stamford, Institution . . . | Dr. W. L. Hopkinson. |
| Stirling, School of Arts . . | Mr. James Morrison. |
| Sudbury, Literary Institution and Museum | Rev. Edward Bull, M.A. |
| Thame, Mutual Improvement Society | Mr. J. C. Tingle. |
| Tunbridge, Society of Literary and Scientific Inquirers | Major Scoones |
| Tunbridge Wells, Useful Knowledge Institution | Mr. N. E. Stevens. |
| Tyldesley, near Manchester, Mechanics' Institution and Mutual Improvement Society | Mr. Caleb Wright. |
| Wandsworth, Literary and Scientific Institution | Mr. A. Coleman. |
| Ware, Institute . . . . . | Rev. R. Ricards. |
| Warminster, Athenæum . . | Rev. H. M. Gunn. |
| Wednesbury, Mechanics' Institution | Mr. Sampson Lloyd. |
| Wellingborough, Mechanics' Institution | Mr. Thomas S. Curtis. |
| Wenlock, Agricultural Reading Society | Mr. R. D. Grainger. |
| Welshpool, Reading Society | Mr. Oliver E. Jones, and Mr. E. Evans. |
| Wisbech, Mechanics' Institute | Mr. George Dawbarn. |
| Winchester, Mechanics' Institution | Rev. F. Bugby. |
| Woburn, Literary and Scientific Institution | Lord C. J. F. Russell. |
| Wolverhampton, Athenæum and Mechanics' Institute | Mr. Thomas Farmer. |
| Wrexham, Literary Institution | Mr. W. Raimondi. |

The CHAIRMAN, in opening the proceedings, said:—Gentlemen, it is my duty, as Chairman of the Council, to preside on this occasion; and, in the first instance, to express to you the pleasure which the Council has in meeting you here to confer with you on the subject of Mechanics' Institutions. I need not tell you that the business to-day is extremely lengthy, and it has required some tact to put it under some general heads, in order that we may not sit here till to-morrow night. I estimate that there are about six or seven classes of subjects to be considered, which it will be desirable for you to discuss; and if we allowed one minute to each representative who intends to appear here to-day, to speak on those six or seven subjects, I am afraid we should have to make up our minds not to go away till eleven o'clock to-morrow night. I think, therefore, you will see there is some reason, as well as some necessity, for our being as brief as possible in what we have to say, and confining our observations to the precise points upon which we wish to speak. I intend to follow that rule myself, and to try and compress what I have to say in five minutes; and with the concurrence of the meeting, I shall ask representatives, if possible, to make it a rule, not to allow their observations upon each distinct point to exceed five minutes. I think unless they are prepared to sit here very much longer than I apprehend they are, it will be necessary for them to come to that conclusion. With your leave, therefore, I shall have the disagreeable office of interrupting persuasive eloquence in the midst of its career, unless you support me in carrying out the arrangement. The Council has felt that in the whole management of this Union, the principle enunciated at the last Conference must be borne in mind; namely, that it is the duty of each Institution to do its own work, and for the Society of Arts to do that amount of work which the Institutes cannot do of themselves, and which can only be done by means of combined action; and therefore I shall ask you to bear in mind that if there is anything you think ought to be done which has not been done, you will reflect for an instant and consider whether it does not come under that class of duties which Institutes ought to have done for themselves, and which, in fact, no central authority whatever could do for them. All the Council can do is to *suggest*, and it is for the Institutions themselves to carry out their own work. Another point I will thank you to bear in mind is, that any thing in this world that is to be done, cannot be done in an instant. Works worthy of being done, do not grow up like mushrooms; if you wish to have an oak tree, you must begin by planting an acorn, and wait patiently for some time for it to develop itself. A number of impossible discussions have been proposed to the Council during the year: for instance, gentlemen living far North, have suggested that we should send down first-rate lecturers—men like Faraday—some 300 or 400 miles, and that the whole expense should come within a pound. Now I confess that no central power which I can conceive would be able to accomplish that feat; and it will be for you to judge how far such a thing is possible. Another point of difficulty I would mention has been the question of the Journal. The Council thought the establishment of a Journal, for every Institute to pour its suggestions into, and to record its advice, its feelings, and its wishes, would be very useful. They accordingly established a Journal at a very considerable drag upon their funds; in fact it involved the expenditure of the funds of the Society to an extent nearly equivalent to the subscriptions of all the Institutes. If that Journal is not what I think it ought to be, and if the Institutes have not corresponded with it, to tell their grievances and their wants, of course it cannot be said to be the fault of the Council. The working of the Institutes' Union has been entrusted to a Committee presided over by Mr. Chester; and certainly if that Committee has not been able to do all that might be thought possible, it has not been for any want of zeal on the part of the Committee, or of devoted attention on the part of Mr. Chester. They have met every week for two or three hours, going over masses of correspondence, and have really done the best they could. It has been their duty to make an address to the Council, setting forth the result of their proceedings during the year, which I shall call upon the Secretary to read before saying anything further.

The Secretary then read the following

## REPORT OF THE INSTITUTES' COMMITTEE TO THE COUNCIL OF THE SOCIETY OF ARTS.

The Second Conference of the Representatives of Literary and Scientific Institutions, and Mechanics' Institutes in Union with the Society of Arts, is to take place on Thursday, the 9th inst.; and it seems necessary that the Committee, which has been charged with the business of the Union, should previously present to the Council a general summary of its proceedings during the past year.

The Committee, in making its Report, draws attention, in the first place, to the number of Institutions already comprised in the Union: that number is 270, of which 250 are in England, 13 in Scotland, and 7 in Ireland. Of 140 Institutions represented at the Conference held on the 18th of May last year, 121 have joined the Union; while 149, not then represented, have accepted the resolutions agreed to on that occasion as the basis of the Union. One Institution has felt it necessary to withdraw from the Union for want of funds, and another has ceased to exist.

During the past year, the works named in the following list have been presented to the Society for distribution among the Institutions in Union:

*Committee of Council on Education*:—Reports of, for the years 1839-40, and 1844-52, with two volumes on Parochial Unions (in all, 17 vols.)

*Commissioners of National Education for Ireland*:—Reports of (in all, 7 volumes).

*Commissioners for the Great Exhibition of* 1851:—Jurors' Reports.

*Department of Practical Art*:—Prospectus; Superintendents' Letters; Catalogue of Museum; Reports on Students' Works; Table of Colours; Statement on Importance of Drawing Schools; and Essay on the Principles of Decorative Art, by Owen Jones.

*General Board of Health*:—Reports and Minutes of Board, and Reports of Surveying Officers.

*Home Office*:—Mr. Tremenheere's Report on the State of the Mining Districts.

*C. Babbage's* Bridgewater Treatise; Remarks on the Income-Tax; and Engraving of his Analytic Engine or Calculating Machine.

*F. and W. Cash*:—Bastiat, on Political Economy.

*J. J. Mechi*:—On Agricultural Improvement.

*Dr. Lyon Playfair*:—Industrial Education on the Continent.

*Price's Patent Candle Company*:—Report on Schools attached to their Manufactory.

*Society for Improving the Condition of the Labouring Classes*:—Various Pamphlets.

*Professor E. Solly*:—On Trade Museums.

*Dr. H. Wampen*:—On Industrial Universities.

*G. F. Wilson*:—On the Stearic Candle Manufacture.

The Society itself has presented:—Its Transactions for the years 1846-8 (1 vol.); Catalogues of its Exhibitions (1 vol.); its Prize Colour-Box; its Prize Instrument-Case; and copies of the following works: Bell's "Outline from Outline;" Rev. W. W. Cazalet, "On Musical Instruments;" H. Grant's "Diagram of Colours;" the Dean of Hereford, "On Self-supporting Education;" G. Sharp's Prize Essay "On Banking;" Taylor's Prize Essay "On Bengal Cotton;" and G. W. Yapp, "On Art-Education."

The Weekly Journal of the Society, which has been stamped for circulation through the Union, has not yet assumed that state of completeness which the Committee desire; but a portion of its space has been regularly devoted to brief notices of the proceedings of the Institutions—to condensed abstracts of their Annual Reports, where forwarded—to circulars and other documents issued by the Council affecting Institutions—and to discussions by correspondence, and otherwise, bearing upon the interests of the Union.

The attention of the Society, and especially of this Committee, in the interests of the Union, as well as of the Society's general objects, has been directed, during the past year, to several subjects, the importance of which will be appreciated by the Conference.

By a Circular dated the 11th November, 1852, the influence of the Union has been brought to bear, with concentrated force, upon Parliament, in favour of Mr. Tufnell's motion for the gratuitous distribution of a selection of Parliamentary Papers to Institutions. A Committee, favourably constituted, has sat upon the subject. Mr. Harry Chester, the Rev. Dr. Booth, F.R.S., two Members of this Committee, Mr. Edward Baines (of Leeds), President of the Yorkshire Union of Mechanics' Institutes, and Representative of that body at the ensuing Conference; Professor Solly, F.R.S., Secretary to the Society of Arts, have been examined before Mr. Tufnell's Committee; and though it has not yet reported to the House, it is confidently expected that Parliament will be recommended to concede this important boon to Institutions.

The Committee have recently had confided to them, by the Council, a general inquiry into the operation of the Fiscal Restrictions on Paper, Advertisements, News, and Foreign Books. That the question is one which has a very important bearing upon the interests of the Institutions, may be considered to be proved by the replies received to the Queries proposed by the Society, on the 8th of March, 1853, as to what Institutions had News'-rooms, and whether they were successful, and as to how far and in what way they were influenced by these restrictions. An abstract of these replies is given in Appendix I. (*Vide* No. 19 of the Journal, page 219), which condenses the experience of the Institutions on the subject. The Committee is still engaged in the prosecution of this inquiry, and hopes that the opportunity of the approaching Conference may be taken to elicit the sentiments of the Representatives with regard to those restrictions.

The condition of the Libraries of the Institutions in Union, and the best means of improving their supplies of books, have been carefully considered by this Committee. By a circular recently issued, the Publishers and Booksellers of the United Kingdom have been invited to cooperate in an arrangement which, without being inconsistent with the customs of trade, would prove of great advantage to Institutions. A liberal rate of reduction was asked for, and the following plan was suggested:

1. The Institutions in Union with the Society will send to the Society monthly (say by the 15th of each month) a list of the books which they wish to purchase.
2. The orders will be given wholesale to the Publishers or Booksellers by the Society monthly (say on the 19th of each month).
3. The Publishers, or Booksellers, will deliver the book, carriage paid, monthly (say the last day of the month), at the Society's Office, or at the Society's Agents, as the Society may determine.
4. Payment will be made by the Society on the delivery of the goods.

The Institutes' Committee have received such replies to this Circular as render it desirable that the Council at the ensuing Conference should bring the subject before the Representatives.

Suggestions made from time to time that the Society might lend useful support to Institutions, by sending to them, on special occasions, interesting objects for exhibition, have been carefully considered by the Committee. Steps have, in consequence, been taken for procuring, *e. g.*, a collection of Photographs capable of being put into a small space for the convenience of transit from point to point, and likely to prove interesting and instructive. This collection comprises a large number of Photographs, supplied by the most accomplished practitioners of the art, and illustrating its different processes and the latest results of improvement.

Your Committee has concluded a negotiation for a general Interchange of Privileges between 162 of the Institutions in Union, whereby a Member of any one of these Institutions, when visiting a town in which any other is situated, may enjoy at that other, for the time being, all the advantages of Membership. It is intended to publish, early in July, a Sheet List of the Institutions in Union, marking those that have agreed to the Interchange of Privileges, which, it is believed, will be found useful to the members of the different Institutions. Arrangements have also been made for the admission of members of Institutions to the Meetings and Exhibitions of this Society. To each Institution in Union within twelve miles of the General Post-office, three transferable admissions to each Meeting and Exhibition are sent; and beyond that distance, members who bring notes from the Secretaries of their respective Institutions are admitted without restriction as to number. It is hoped, that as the Union is strengthened, the Interchange of Privileges thus effected will assume new and important features, and one has already been suggested by a Circular dated the 19th July, 1852, pointing out how easily local museums might be formed by a systematic interchange of specimens. An abstract of the returns to this Circular is given in Appendix II. (*Vide* No. 3 of the Journal, page 30.)

The subject of Lectures has occupied the continued and anxious consideration of the Committee. It is one of extreme difficulty, but they feel unabated confidence that time and experience will enable the Society to obtain important benefits for the Union in this respect. In the meantime, they have collected information which tends towards a solution of the difficulties by which it is surrounded. On this question a letter has been received from Mr. Hughes, which was published in No. 28 of the Society's Journal, setting forth the results of his experience as a lecturer recommended by the Society. They desire also that the attention of the Representatives at the Conference should be particularly directed to the Report on this subject presented by the Committee to the Council. A copy of these documents is given in Appendix III. (*Vide* No. 28 of the Journal, page 333, and No. 8, page 88). They consider that the periodical Conferences will afford great facilities for making combined arrangements with Lecturers, and they think that the present occasion should be specially turned to account, by laying a foundation for such combinations. The Committee, after much inquiry, have determined to make no recommendation on the subject of Lectures until they have had an opportunity of hearing the opinions of the Representatives, and of ascertaining from them the extent of co-operation, on the part of the Institutions, which may be relied on by the Society.

To elicit information as to the progress and results of Institutions, with suggestions for their effectual improvement, a special Prize of the Society's Medal and 50*l.* was offered for the best Essay on the following subject:—"On the History and Management of Literary, Scientific, and Mechanics' Institutions; and especially how far, and in what manner, they may be developed and combined, so as to promote the moral well-being and industry of the country." The prize has been awarded to Mr. James Hole, Honorary Secretary to the Yorkshire Union of Mechanics' Institutes, and his Essay is in the hands of the Messrs. Longman for publication.

Your Committee has inquired into the Legal Position of Institutions, and upon this subject has presented to the Council a Report, upon which it is desirable that the opinion of the approaching Conference should be taken. A copy of the Report is given in Appendix IV. (*Vide* No. 11 of the Journal, page 124.)

Through another Committee of the Society, the attention of the Institutions in Union has been drawn to the important subject of Industrial Instruction.

In conclusion, the Committee refer to the measures which have been taken this year with the view of connecting the Conferences of the Union with collateral opportunities for instruction and amusement. These, it is hoped, may be so extended in future years as to render the stay of the Representatives in Town as useful and as agreeable as possible.

(Signed) HARRY CHESTER,
Chairman of the Committee.

*Society of Arts, June 6th*, 1853.

At a Meeting of the Council of the Society of Arts, held on the 6th day of June, 1853, the foregoing Report of the Institutes' Committee having been read, it was

RESOLVED, — That the Report be approved and adopted; and that it be presented to the Representatives of the Institutions in Union at the Conference on the 9th inst.

(Signed) EDWARD SOLLY,
Secretary to the Society of Arts.

The CHAIRMAN resumed: The Institutes Committee have thought from the very great multitude of suggestions that have been brought before them, that it will be well if they are discussed under the following heads. First, Parliamentary Papers. Second, The provision of Books and Maps. Third, News-rooms and Reading-rooms. Fourth, Lectures. Fifth, Classes, &c. Sixth, Statistics and Trade Museums. Seventh, the Legal Position of Institutes. Amongst the suggestions sent to the Committee, all will be found to group themselves, more or less, under those respective heads, and I hope gentlemen will take each head by itself. I hope the representatives will not go into a second subject before they have discussed and finished the first; and, as I have said before, I am going to ask them to bind themselves down to five minutes on each subject. Of course we are quite willing to receive the suggestions of everybody, but as there are a great number of Representatives present, and very few who are not, we think it right to make a rule that no one should speak who is not a Representative, and that each Representative as he rises should mention the Institute he represents.

### I.—PARLIAMENTARY PAPERS.

Mr. EWART, M.P. (Annan), as a member of the Parliamentary Committee, on the question of Parliamentary Papers, thought he might save some time if he briefly stated the present position of the Committee on that subject. They had gone through the evidence, and were now ready to report. Mr. Tufnell, the Chairman of that Committee, had been prevented by illness from summoning the Committee to agree to a Report; but he thought he might safely say, the Report would be such as would give general satisfaction to the Institutes throughout the country. They had gone into the question of public libraries, and literary and scientific Institutions generally, and he believed the Report would be quite in harmony with the general feelings of the Society.

Mr. SLANEY (Shrewsbury) took a deep interest in the subject, and thought nothing could be of greater utility than a selection of the Parliamentary Papers to be distributed through the country, especially as giving just views of facts and statistics. Having been long in Parliament himself, and having felt the great loss of not being able to have reference to subjects of this nature, from the complexity of the mode in which the indices were made out, he thought some simple index, pointing out the various subjects, and drawn out by some one acquainted with the work, would be of the very first importance, and might be done at a very small expense by volunteers, if it was not done by the Committee now considering the subject. Without speaking of party politics at all, he was convinced that a knowledge of the facts of the varied questions would go far to content many persons, and to give them a view of the truth, which they could not otherwise arrive at. Many intelligent members of the working classes would be very thankful for the opportunities of acquiring just views which would be afforded by the distribution of these papers.

Mr. W. J. FOX, M.P. (Oldham), said, huge masses of valuable statistics and interesting information were buried in the blue-books, of which the public very often knew nothing; and the materials for many popular novels and popular treatises were drawn from this source. What he wished to suggest was, that not merely the gratuitous distribution of a selection of these papers was desirable, but, what he took to be yet more desirable, and more productive of general convenience, would be the circulation of a descriptive and priced catalogue of the Parliamentary Papers. The price affixed was generally so exceedingly low, that there was scarcely an Institute in the country but what could afford to purchase a considerable number; and whilst they would be grateful for a selection made for them, he thought a vast number of the Institutes would very much prefer to make a selection for themselves, if they had the opportunity of doing so: and it was only by means of such a catalogue as he had suggested that they could possess the means. If it were necessary to quote authority, he would remark that a suggestion of the kind was thrown out by Mr. Disraeli, when leader of the House of Commons, at the time the subject was discussed during the late administration; than whom a more excellent judge of the value of the materials existing in these books need not be desired.

Mr. **Edward Baines** (Leeds), who attended on behalf of the Yorkshire Union of Mechanics' Institutes, said, that a resolution was passed at a recent meeting of that Union in favour of this object. They had a meeting at Thirsk, at which the 128 Institutes belonging to the Union were represented, and they came to a unanimous decision on the subject. One of the great difficulties which presented itself to the Committee when he gave evidence before it, was as to the mode of sending down these papers; and he would ask Mr. Ewart, if it were not an impertinent question, to tell them if that difficulty had been overcome, and whether they could be sent to the various Institutes without much expense—for the expense of sending them, especially to small Institutions, was felt to be a great difficulty. Another difficulty was, as to who should make the selection of these papers, for they would be completely overwhelmed if they received the whole of them.

Mr. **Harry Chester** thought it was hardly fair to ask Mr. Ewart to answer these questions. He wished to bring the matter to a close, as far as members of the Institutes' Committee were concerned. He had been requested by Mr. Tufnell to bear a special message to the Conference, to say how much he regretted that he was unable to take part in the proceedings. They were all aware that the original suggestion, so far as it was public, was made by Mr. Tufnell. He said at this Conference last year, that he had given notice to move for the Committee. Mr. Tufnell had paid a great deal of attention to the subject, and had collected evidence both in this country and in America; and he (Mr. Chester) might say, as an observer of what was going on, that he thought the Institutes need not be apprehensive that they would be put to any very great expense in regard to such Parliamentary papers as the Committee might think right to distribute.

Mr. **Radford** (Devonport) said he was examined as a witness before the Committee on Parliamentary Papers, and he thought the course taken by the Committee proved they had considered all these questions. Each gentleman seemed to be anxious to get at the evidence of the best way of conveying these documents, so as to prevent any expense to the Institutes. The question was gone into relative to the selection, and it seemed to be the prevailing opinion that the Institutes themselves should have the right of applying for certain documents which they might consider of special importance to the districts in which they were situated. At the same time it was thought generally right, that in regard to papers of universal interest, they should be distributed without application. He thought they would do right to leave the matter in the hands of the Committee.

Dr. **Hunter** (Margate) remarked that it seemed to him that most of the difficulties had been met by the suggestion of Mr. Fox In the present stage of their information he thought, therefore, they would do well to leave this subject and go on to the next; because until the Report of the Committee was published, it was impossible to enter fully into the matter.

Mr. **Bramwell** (Mayor of Durham) remarked that it would be difficult to make a selection of these papers, because it often happened that subjects would arise unexpectedly on which information was required, and unless they were in possession of the full body of the reports that information could not be obtained.

Mr. **Madeley** (Derby) said, it would be very well if they had Catalogues, but as it was not customary to print an unlimited number of these papers, it might often happen that when they had selected from the Catalogue the paper they wanted, it would be out of print. He thought therefore that it was necessary that there should be a Committee of Selection, to whom it would be best to leave the matter.

The Rev. Dr. **Booth** thought that much of the discussion was useless, as the question having been for months before a Parliamentary Committee they had doubtless made up their minds on the subject.

Mr. H. L. **Smith** (Southam), said, that the Parliamentary Papers often contained much valuable matter which could not be gleaned from their titles. By following Mr. Fox's suggestion, and publishing a digest of each Paper, persons would often be helped to information where they did not expect to meet with it.

Mr. G. W. **Yapp** (Chelmsford), remarked, that Hansards' did publish monthly, during the Session, at a charge of threepence, a numerical List of the Papers published, with the prices attached; and also a subject Index at the end, by which reference could be made. These would not, however, supply the place of the digested indices to which Mr. Fox had referred, as they did not give reference to a vast amount of statistical matter contained in the appendices of the Reports. This required to be supplied; and he thought the *Journal of the Society of Arts* would be a proper medium for supplying it. He would be happy if he could render any assistance in regard to it.

### II.—BOOKS, MAPS, APPARATUS, ETC.

The **Chairman** said the provision of books and maps was the next subject, and was one with which it was necessary to use a good deal of caution and deliberation, at the present time; because, as they were aware, there was a discussion now before the public as to the propriety of any combination,—whether private combinations, or combinations represented by Government—interfering with questions of trade. It was contended that they ought not to have books cheap, because it might interfere with trade, and that it was not the proper business for Government at all. He thought, perhaps, the Institutions throughout the country might not feel that responsibility on the subject which Government felt, and would probably wish to get books for their Institutes as cheaply as possible, and thus promote the cause of education. They would have seen in the Report of the Committee the suggestion on the subject, and the mode by which it was to be accomplished. He might add, that offers had been made by some of the most respectable publishers, to supply books to the different Institutes at discounts varying from twenty-five to fifty-five per cent. In some cases the answers were favourable; in others the negotiations were still going on, and in some the question was evaded. But the matter for the consideration of the meeting was, whether the proposition set forth in the Report was one which, on the whole, they would like to see carried out or not?

Dr. **Hunter** (Margate) thought the subject was one on which no difference of opinion could exist, as it was doubtless important to get books as cheap as possible; but as negotiations were still going on, they might content themselves with expressing a general opinion that the Institutes felt themselves indebted to the Society of Arts for facilitating the obtaining of such books as were necessary for distributing knowledge among the masses.

Mr. **Joynt** (Limerick) thought if they could get good books on cheap terms, no one would reject the opportunity; the only question would be, the propriety of acceding to the terms offered by the various booksellers. If therefore the Society was not in a position to give the answers of the booksellers at present, it would save time to leave the matter entirely in their hands. The selection of books, he apprehended, would be a matter best left to each Institute.

Mr. Chester said, the Society would exercise no control over the selection; but if the representatives present thought fit to authorise them to go on with the negotiations, they would enable each Institute to purchase such books as it might select at a cheaper rate than could be done without combination.

Mr. Slaney (Shrewsbury) thought it would be best to leave the matter in the hands of the Committee, and referred to the fact that authors were generally allowed a discount of 25 per cent. on any works they purchased.

Mr. Chester said he had a list of the replies already given, as to the amount of reduction offered, but as it was incomplete he would rather not read it. He might just say that they contemplated obtaining something more for the Institutes than the opportunity of purchasing at the usual wholesale prices. The idea was suggested by the arrangement of the Committee of Council on Education, who were thus enabled to supply the schools in connection with it with books at a very reduced rate. It was finding how readily the publishers came into that arrangement, and how those publishers who had not been connected with the arrangement at first were now making application to be so, that had suggested to them that the time was now come when publishers were too wise and too liberal to feel any jealousy about entering even into any arrangement which was for their own interest, if such a motive as self-interest were necessary to induce them to accept it.

Mr. G. Offor, Jun. (Hackney) thought this was a question on which there could be but one opinion. The Institutes were bound to purchase books at the cheapest market, and he did not think that any question of interfering with trade ought to influence them.

Mr. Warren (Royston) remarked that as a bookseller himself he felt sure that no body of men would rejoice more than the booksellers at any arrangement whereby the Institutes would be benefited. He did not quite agree with the last speaker, however, in saying that they ought not to consider whether it would interfere with trade. He did not think the booksellers would offer any objection to the reduction to Institutes if the private trade were not interfered with, and arrangements made to confine the reduction strictly to the Institutes.

The Rev. J. S. Howson, M.A. (Liverpool), remarked that the subject before them included maps as well as books, and he presumed diagrams, philosophical instruments, and educational apparatus generally. As regarded books, the question was he thought easy; but with regard to instruments, &c., it was more difficult, as they could not very well describe them sufficiently clearly to the Institutes, and it would be difficult to judge of them without seeing them. He spoke as a practical schoolmaster engaged in teaching boys; and he knew from experience that whilst it was easy to find the best books, it was not so with regard to educational apparatus. He thought it might be of the greatest possible advantage to the whole country, if a permanent exhibition of educational apparatus could be established in London. He had learned more on the preceding evening by looking at the apparatus exhibited at the Mansion-house, than he could have done by reading a dozen catalogues.

Dr. Booth said, it was in contemplation by the Society of Arts to get up an Exhibition of Educational Apparatus not limited to the models produced in this country, but comprising those, many of them much superior, made on the continent, and especially in France and Germany. In fact what the Great Exhibition had done for manufactures they wished now to do for education; they would get the best models from different countries, and then gentlemen interested in the subject would be able to visit the Exhibition, and select such apparatus as they found best fitted for the purposes of instruction.

Mr. Pond (Southampton) said, in reference to the question of interfering with trade, the booksellers at Southampton had, unasked, made a reduction to the Polytechnic Institution there; and provided they were properly secured from private individuals getting the books at the reduced rate, he felt sure that booksellers generally would readily agree to the arrangement.

Mr. Redgrave said that the Committee intended to take precautions that private persons should not be able to avail themselves of the advantage of the reduction, and booksellers would in point of fact be benefited by books getting noticed in quarters which they did not before reach.

Mr. Buckmaster (Battersea) thought the subject of philosophical apparatus was of the utmost importance. He referred to the work of Professor Willis on the manufacture of philosophical apparatus, and said much might be done in the way of making this apparatus by persons connected with Institutes, if they would only endeavour to develop their ingenuity. He had travelled over the Midland Counties, and given a course of lectures on agricultural chemistry with a set of apparatus that did not cost more than 2*s*. He thought much might be done by the exercise of individual ingenuity; at the same time, he was very anxious that the Society of Arts should have an exhibition of useful philosophical apparatus.

The following Resolution was then moved by Mr. Gowing (Ipswich), seconded by Mr. Bramwell (Mayor of Durham), and carried unanimously,—

> "That this meeting approve the steps already taken by the Institutes' Committee of the Society of Arts, respecting the cheapening of books, maps, diagrams, and apparatus; and request them to continue their labours."

### III.—NEWS'-ROOMS AND READING-ROOMS.

The Chairman said, he would now call their attention to the fiscal restrictions on advertisements, news, and foreign books, so far as these restrictions affected the reading-rooms, &c., of the Institutions.

Mr. Bramwell (Mayor of Durham) said it was manifestly for the benefit of the people at large that all fiscal restrictions which retarded the spread of knowledge should be removed, and he thought it would perhaps be most to the purpose if a resolution to the effect, that all fiscal restrictions which imposed difficulties of that character should be got rid of as speedily as possible.

Mr. E. Baines (Leeds) would have pleasure in seconding such a Resolution. Personally he thought he was interested in the maintenance of the present system of which he individually had no reason to complain. But he did not think that one word could be said in favour of existing restrictions that might not with equal propriety be said in favour of a censorship of the press. As, however, cheapness in literature of every description for every class of society capable of availing themselves of it was the object which he thought they all were anxious to promote, he would have pleasure in seconding the Resolution.

Mr. Slaney (Shrewsbury) remarked that in reference to newspapers they had one great advantage in the cheapness of postage under the present system: at the same time he hoped to see all kinds of restrictions on the spread of knowledge removed as speedily as possible.

Mr. Ewart, M.P. (Annan), observed in reference to the advantage which the stamp conferred in cheapness of postage, that it had the effect of fixing newspapers in one place; for instance in the metropolis. He would be glad to see an extension of local newspapers as a vast means of promoting the education and instruction of the people in regard to those topics which concerned themselves peculiarly. The present restrictions did in point of fact amount to a censorship of the press, and he firmly believed that the people of this country would not long endure such a system.

Mr. W. J. Fox, M.P. (Oldham), remarked that this large subject could be better discussed elsewhere. He thought the best thing they could do now would be, to give an opinion as to whether they approved the mere reduction of the advertisement duty, or its total abolition. That was a question in reference to which all teachers had a strong interest, not merely because of its effects on the price of books, which was very considerable, but also because of its direct taxation upon instruction, in preventing lecturers from giving such notices, as they might otherwise do, in order to obtain a good audience. It also prevented in various ways the free communication of literary intelligence. It gave him a sense of shame at times when he saw the advertisements of professors of other countries announcing instruction at such low rates as 6*d*. per lesson, to think that for each of those announcements these gentlemen must pay 1*s*. 6*d*. to the English Government. He thought this was a question therefore on which the Chancellor of the Exchequer ought to know their opinion.

Mr. Morris S. Oppenheim (Jews and General Literary and Scientific Institution) wished to know whether it was intended they should pledge themselves to the abstract principle contained in the Resolution, which involved a question of political economy and of political philosophy. He feared if such a Resolution were pressed in the abstract, it would not be carried, because it involved a question of finance. No doubt all persons who were consumers would be in favour of the abolition of those taxes which affected the articles they used, but it would be very like appealing to self-interest for them to take such a ground.

Mr. Boorne (Reading), said, they were not discussing the principle in general, but merely in its relation to the working of Mechanics' Institutes. Much of their success depended upon newspapers and books, in rendering their institutes attractive; and these taxes operated injuriously on the Institutes generally, by limiting them in these means of attractiveness. In reference also to announcements of lectures, &c., it often happened that they could not have them inserted, lest by a full announcement they were made liable for the advertisement duty. The question had recently been discussed in the directory of the Institute with which he was connected, and they very heartily welcomed the efforts of the Society of Arts in the cheapening of books, and in removing restrictions from literature generally.

The Rev. H. M. Gunn (Warminster), believed it was a general impression that the great disappointment felt throughout the country in regard to Mechanics' Institutes not having prospered more than they had done, was in a large degree owing to causes in connection with the present subject. In the town where he resided, their Institute, which had before almost dwindled away, had now more than 300 members, although the town had not more than 6,000 inhabitants; and this was mainly attributable to the newspapers now taken in; and although it was found to be a great expense, they still found it their interest to take in these papers. It must be manifest, therefore, that as in their case, so in others, a reduction in the cost of these articles would materially affect the prosperity of these Institutions.

Mr. Vallentine (London Mechanics' Institution) thought this was a question of political economy affecting the whole of the community, not Mechanics' Institutes more immediately than the general public; and that in discussing questions like this they were aiming at too much, and by that means would probably effect nothing.

Mr. Nelms (Gravesend) differed from those gentlemen who called this an abstract question. It appeared to him materially to affect the interests of the Institutions, and prevented the diffusion of knowledge generally. In the district in which he resided they had only one local paper, whereas if these restrictions were removed they might have three or four.

Mr. Jack (Newport, Monmouth), thought they ought to devote their whole energies to obtaining the total abolition of the advertisement duty. They could not give publicity to their Lectures on account of this duty. There was also a large number of good books published at low prices of which they had not the opportunity of hearing, because the advertisement duty prevented them being extensively advertised.

Mr. Wade (London Domestic Mission) added some further remarks in favour of the removal of those restrictions, and reducing all kinds of literature to the lowest possible cost. Knowledge, he thought, should be as cheap as bread, and food for the mind as free as food for the body.

Mr. Allport (Camberwell) thought if the movers and seconders of the Resolution would agree to the introduction of a few words into it, giving it a more specific reference to the case of the Institutes, there could be no possible objection to it.

Dr. Hunter (Margate) thought they had nothing to do with the political aspect of the subject, but should regard it in its social aspect. They were to look at these taxes as something shackling the distribution of knowledge, and therefore ask the Legislature to abolish those imposts which acted as a hindrance to the general well-being of society. The political bearing of the question would be discussed elsewhere. If the Government could remove these taxes, he hoped they would; if they could not, it was certain they would not do so. He had no fear of asking too much; he thought they should ask for as much as possible, and be thankful for what they might get.

Mr. Chester thought the subject had taken a wider range than was consistent with the character of the meeting (No, no). He was unwilling to move an amendment, and he thought some resolution might be proposed which would meet with the almost unanimous consent of the meeting. It was important that the Conference should not be of a political but of a general character, and its resolutions should be limited to the bearing of the various subjects under consideration upon the Institutions connected with the Society.

Mr. J. Ferguson, M.P. (Carlisle), thought that the energies of the Council should be concentrated on the endeavour to obtain the abolition of the advertisement duty. The Government knew what the wish of the public on that point was, and it was ready, with a little more pressure, to yield to the influence from without.

Mr. Joynt (Limerick) suggested that the Society should lay its opinion distinctly before the Government, and thus show that literary societies were not altogether open to the charge of not being practical in their movements. The question, he considered, was not so much a political as a social one. If Institutions had the means of advertising to a greater extent, the number of their members would increase, and their means of usefulness be greatly extended.

Mr. **GRANT** (Dalston) thought it would not be expedient for the Conference to ask Parliament for the entire abolition of the advertisement duty, but simply for the abolition of the duty as it affected literary and educational Institutions. As to the amount of duty on paper, it was so exceedingly small as scarcely to affect the matter of education. He was acquainted with the subject practically, and he believed the amount of the paper duty scarcely ever affected the cost of books. The greatest tax to literary societies was unquestionably the advertisement duty.

The following Resolution was then moved by Mr. **BRAMWELL** (Mayor of Durham), seconded by Mr. **EDWARD BAINES** (Leeds), and carried unanimously :

> "That this meeting is of opinion that the fiscal restrictions on paper, advertisements, news, and foreign books, have an injurious effect on the Institutions in Union with the Society of Arts, and that the Council be requested to proceed with their investigation on the subject, with a view to the abolition of all such restrictions."

### IV.—LECTURES.

The Rev. **EDWARD BULL**, M.A. (Sudbury), said the Lecture department of Literary Institutions became of more and more importance as those Institutions increased and ramified. The object of lectures was to convey solid instruction, but in too many instances the amusing and the imaginative had been allowed to take the place of the useful and real. What would be thought of lectures being delivered in a literary institution (as he had known to be the case) on mesmerism and phrenology, or on "spectral illusions," when a lecture on optics would have been much better ? Something was needed to arrest the growing evil, and he trusted that the Council would direct its attention to the subject. It had no legal influence, it was true, but it had a moral power. It might, perhaps, with advantage publish a list of useful lectures, if not an *Index Expurgatorius*, for the benefit of the different societies throughout the country.

Mr. **BECKE** (Northampton) suggested that arrangements should be made by societies in different localities as to what lectures they would require, so that they might, with the assistance of the Council, unite in engaging the services of eminent gentlemen in London or elsewhere.

The Rev. J. **SAUL HOWSON**, M.A. (Liverpool), believed that any attempts in Mechanics' or other Institutions to combine elementary teaching with the instruction of adults would not be permanently successful. He was connected with an Institution, the essential part of which consisted of day-schools for the *boná-fide* education of boys; with which were connected popular lectures for the public, and evening classes for adults. While the day-schools were comparatively thriving and improving, with every prospect of indefinite improvement for the future, the other two departments were fading away more and more; the lectures were gradually decaying, and evening classes were not flourishing. He believed there should be always a division of labour in education, and that any institution where day-schools formed an essential part of the system adopted, should not mix itself too much up with other parts of industrial education. One reason, he thought, of the decay of lectures, was the widely-spread notion that lectures could educate. Persons attended them with great eagerness, expecting to be educated; they were disappointed in their expectations, and went away disgusted. Many Institutions had substituted amusement for instruction, much to the dislike of the more serious and sober-minded of the managers; the management then usually fell into the hands of incompetent persons, and the Institutions became entirely altered in their character, or gradually decayed. A similar state of things had perhaps tended to throw the management of lectures into the hands of persons who had no serious ideas of religion, and thus many religiously disposed people were alienated from the Institutions. Another cause of the decay of lectures was the fact that books could be purchased at a very cheap rate, and be read at home by the fireside; added to which, many persons who formerly attended lectures could no longer do so, as they lived some distance in the country on the different lines of railway. The two last causes were perhaps not much to be regretted. It was quite possible to have an exaggerated view of the value of evening assemblies of young men. Of course it was a great thing to keep a man from the public-house; but after all, the best place for a working man in the evening was by his own fireside, with his wife and children; and the best thing that could be done would be to educate the girls in the domestic duties to which they had to attend in after life.

Mr. **BUCKMASTER** (Battersea) differed from the Rev. J. Saul Howson, believing as he did that lectures were a very important element in all Institutions. In the small Institution with which he was, and had long been, connected, the lectures had often been the only means of keeping the members together. The reason why there was not sufficient interest felt in scientific lectures was to be found in the fact that the great mass of the population was not prepared to appreciate them, the subject of physical science having been neglected in most of the elementary schools in the kingdom. Another cause was the expensive nature of lecturing apparatus. A lecture on the electric telegraph could not be properly given without an expenditure of 20*l.* or 30*l.* for apparatus. The proper course to be taken was to increase the efficiency of elementary schools, so as to prepare the minds of the rising generation to appreciate the instruction which lectures, when properly delivered, were so well calculated to afford. One gentleman had complained of the delivery of a lecture on spectral illusions. If the lecture had been announced as a lecture on optics, some persons might never have known what it was. Very possibly it was a lecture on optics, and if the public was deceived it was a very agreeable deception, involving no great moral wrong. He thought the Society of Arts would do well to have a list of lecturers whom they could recommend to country societies, who would then be relieved of some difficulty in the choice of proper men. The main fault of lectures hitherto was that there had been no kind of organization; and he hoped the Council would endeavour to recommend some means whereby that evil could be remedied. He did not object to the mixing the entertaining with the instructive, but believed that much good often resulted from the combination.

Dr. **LYON PLAYFAIR** said, there was so much good sense in the remarks of the last speaker, that he was anxious to convert them into a living faith in the mind of the meeting. When Mechanics' and Literary Institutions were first established, they were established with the definite object of giving systematic instruction in the various arts and industries which were of importance to this country. It was found necessary by the managers of those Institutions to depart from that systematic instruction, for the very simple reason that secondary instruction in science and art was attempted before primary instruction was afforded. Their constituents consequently had no settled habits to keep them together; they were then given a variety of instruction and amusement. The number of members was thus increased, but there was a decrease in the average time which each person remained in the Institution. It was therefore of great importance, if the Institutions were to be made successful, that they should endeavour to infuse a knowledge of science into the elementary schools, so as to raise up a class of men who in a few years hence would give life and vigour to the Societies with which they might be connected, so as to prevent them from languishing or decaying. Then lectures would no longer be unprofitable, but would succeed admirably, and bear excellent fruit. He believed there was a great desire on the part of large numbers of artizans to acquire, even now, that systematic instruction which would enable them to value the lectures which were given in the various Institutions. He would mention one example, which came within his own experience. He was attached to the Metropolitan School of Science. Last winter a systematic course of lectures was delivered to artizans with the greatest success; and during the present year a similar course, but still more systematic, had been delivered by eminent professors. An advertisement was inserted on the Monday morning in the *Times;* by Tuesday, at 12 o'clock, all the tickets to be disposed of (600) were applied for; and by Tuesday afternoon, more than double that number of applications had been received. He believed that all the Institutions in the country that had faith in the potency of systematic instruction were flourishing; he knew of many which contained 700 or 800 young men who were going through regular systematic courses of instruction, endeavouring to obtain that knowledge which they did not obtain in elementary schools. He was anxious that the representatives should go back to their various localities with the belief that their Institutions would not finally succeed, or do that which they anticipated, unless they introduced into their elementary education that knowledge of science which was necessary to enable men to understand the works of God—to enable this country to occupy her position as an industrial nation.

Mr. W. J. FOX, M.P. (Oldham), expressed his concurrence in the remarks of Dr. Playfair. The Institution with which he (Mr. Fox) was connected had had no lectures during the past year, having generally found them desultory, unproductive, and expensive. The members, young men who were earnest in their pursuit of knowledge, acquired a distaste for such rambling dissertations. But after all that had been said about the decline of lectures, they formed too valuable an agency upon the public mind to be lightly relinquished. What was wanted was organization, springing from a central point. If the Society of Arts could designate certain qualified persons as competent lecturers, and arrange certain circuits where courses of lectures could be given by them, there might be a continuous supply of instruction afforded throughout a great part of the country.

The DEAN OF HEREFORD said he attributed most of the success which had attended his educational exertions to the fact of his having made the knowledge communicated to bear on the practical duties of life. He had no doubt that the lectures contemplated by the Society of Arts would be most successful. It was true, as had been said, that a person might derive useful knowledge from reading at home; but there were many experiments which he could not conduct himself, and with which he could only be made acquainted in the lecture-room.

Mr. LOGAN (Cork) alluded to the advantages resulting from the delivery of lectures, instancing the case of Cork, where he said a great improvement in the mental habits of the people had taken place in consequence of the lecture system introduced by Professor Jardine, in conjunction with the establishment of classes for the members. Mere popular lectures he considered were of little value as compared with systematic courses, containing solid and useful instruction.

Dr. BENSBACH (Galway), said that in cities like London, where there were so many places of amusement, literary Institutions need not combine light entertainment with instruction; but in small towns he thought the two must be generally linked together. The lectures and entertainments should always be adapted to the class of persons addressed, and he thought much benefit would result from a combination among the different institutions of the country, with a view to regular courses of lectures by eminent professors

Mr. JAMES HOLE (Leeds), said the Yorkshire Union had tried for some time past the system of engaging gentlemen to deliver courses of Lectures at different Institutions within its district; but had failed, chiefly in consequence of the inability of many of the poor Institutions to pay the necessary expenses,—amounting at least to three or four guineas per lecture. All efforts at combination and organization in regard to the delivery of lectures would, he thought, be an utter failure. Some of the Yorkshire Institutions were kept in debt for a number of years from a single outlay for a course of scientific lectures. Finding a difficulty with regard to paid lecturers, the Union had lately recommended the plan of gratuitous lectures. The names of persons who were willing to deliver gratuitous lectures, and the subjects, were published; and from this list some Institutions were enabled to arrange for an entire course without any cost for lecturers beyond that of occasional travelling expenses.

Mr. SLANEY (Shrewsbury) recommended the delivery of Lectures on subjects connected with the sanitary condition of the people—ventilation, drainage, the choice of houses, and the like; and offered *50l.* for apparatus which should be available for illustrating that subject. He anticipated the best results from such lectures, delivered by persons accredited by the Society of Arts, as there were many little scientific contrivances tending to promote the health of the people which could be adopted by them with but little cost, when they were once explained and recommended to them.

The Ven. ARCHDEACON FREER (Hereford) urged upon the Council the expediency of adopting some means by which country societies could be supplied with professional lecturers; and expressed the great obligation laid on the friends of education by the Dean of Hereford in his zealous labours in the cause—labours, he said, which had called numerous schools into existence, and brought the means of education within the reach of the poorest of the agricultural population in his district.

Mr. GOWING (Ipswich) hoped that lectures of a miscellaneous character would not be lost sight of; while he trusted that they would be often followed by special lectures to impart more specific and useful instruction. The general lecture he regarded as a stimulant, as giving the first impulse which induced persons to attend the special lecture. He recommended applications to be made to scientific or literary gentlemen to deliver lectures at the Institutions in their various localities; and that assistance should be given to them in the preparation of diagrams by any of the members who could render it.

Dr. **Booth** thought the meeting need not discuss the abstract value of lectures, but would do better to consider the expediency of giving the Council instructions on the subject of providing lectures for Institutions during the ensuing year. The Institutes' Committee had patiently considered the subject for many weeks, and had received from different quarters many propositions—some good, and some attended with insuperable difficulties. The two principal difficulties with which the Committee had to deal were, first, the want of funds; and secondly, the reluctance felt by the Committee to do anything which might seem to interfere unduly with the management of local Institutions.

Mr. E. **Halsall** (Bristol) briefly adverted to the subject of elementary schools in connection with Mechanics' Institutions.

Mr. R. W. **Kennard** (Falkirk) said he should like to move a resolution to the effect that a staff of lecturers be recommended by the Society of Arts, who, from their attainments in science or literature, would be entitled to general confidence; each Institute being allowed to choose its own lecturers from this staff without being necessarily restricted to it, and each, of course, arranging the mode by which the remuneration and expenses should be defrayed.

Mr. R. E. F. **Smith** (Portsmouth) would second such a Resolution, and urged upon the Society to continue its exertion in procuring a good staff of lecturers for the benefit of the country Institutions.

Mr. **Albert Beetham** (Lymington) called attention to the suggestion made in the Appendix to the Report, to have lectures prepared in London, and sent to country towns for delivery, where Institutions could not afford to pay the expenses of a professional lecturer.

Mr. **Chester** thought the resolution proposed to the Conference too vague in its character to be of any practical utility. The Council was desirous of ascertaining from the meeting how the combination could be worked so as to produce the desired result. The Society was asked to supply a list of lecturers—that it undoubtedly could do: but that might also be done by any intelligent person living in London. The Council needed some power to act definitively and effectually. It had been suggested that a staff of lecturers should be engaged at regular salaries, and sent round to the different Institutions. Was that a measure the Conference would desire to adopt? (No, no.) Or would the different Institutions arrange among themselves as to what lectures they wanted, and then set about supplying the necessary funds? If some specific plan of that kind could be agreed upon, the Council would endeavour to carry it out.

Mr. J. F. **Hollings** (Leicester) said that no kind of union could be established with reference to lectures between the different Institutions in the Midland Counties, and he feared that such a combination would not succeed elsewhere. He believed that though there might be for several years a great desire to attend scientific lectures, the interest would soon flag, and the attendance fall off. The best plan, he thought, would be to let the Institutions alone, and to leave the solution of the problem to time and the hour, waiting patiently till the elementary schools had produced a generation with a greater taste for scientific pursuits and attainments. After all, the managers of Institutions were obliged to conform to public opinion; otherwise they would incur debt, and the Institutions would decay. The Institution with which he was connected had done away with lectures except such as were given gratuitously; and it was now recovering from its difficulties, and was in a state of comparative prosperity.

Mr. **Radford** (Devonport) thought that to give up popular lectures was the surest step to take towards the dissolution of the Institutions. They were not met to discuss the desirability of lectures, but to suggest to the Society any means by which they could aid Institutions in the country. The Council might render some assistance, but he warned the representatives not to expect too much from it, and advised them to rely more on their own exertions. Country Institutions were often put to a great expense in the carriage of books and apparatus from London, and the payment of the travelling expenses of lecturers. He thought the Society would do well to take that matter into consideration, and apply to the various Railway Companies in the kingdom to grant a reduction of fares in the case of lecturers passing to and from Institutions for the purpose of delivering lectures. Recently the Society with which he was connected paid 30*l.* for two lectures, the lecturer travelling by first class, and having to bring with him a large amount of apparatus. He thought much benefit would attend occasional local conferences of Institutes in different parts of the country, and would recommend them to the consideration of the Council.

Mr. **Allport** (Camberwell) suggested that the Council should prepare a list of lectures on different subjects, attaching the prices at which they might be obtained, for the guidance of those Institutions where a difficulty was felt in the selection; and if an offer could be made to supply such lecturers at reduced rates in case several Institutions would combine, he had no doubt that frequent combinations would take place.

Mr. W. **Nichol** (Liverpool Mechanics' Institution) thought the Society could simply act as a corresponding agency to assist those Institutions who could come to an understanding among themselves as to what lectures they required, and what they were willing to pay.

Mr. **Winter** (Grantham) said that the Society which he represented relieved itself from its pecuniary difficulties by exhibiting an instructive diorama for six days, which brought in more funds than were lost in a whole course of lectures. He would suggest that the Council should have such a diorama for the benefit of such Institutions as would like to exhibit it to their members.

Mr. **Yapp** (Chelmsford) thought there was a greater demand for lecturers in the southern and midland counties of England than the gentlemen from Yorkshire, arguing from their own experience, seemed to imagine. The great difficulty that was felt was that of engaging suitable lecturers and selecting fitting subjects; and in these matters the assistance of the central Society might be very advantageously rendered. The object, he thought, should be to collect morsels of information from different quarters, and send them out again in an available form. Every Institution should consider it its business to tell the Society of Arts what it knew about lectures; and the Society of Arts should put all the information it obtained in a simple form, and through the medium of the Journal disseminate it again throughout the whole country.

Mr. **Edwardes** (King's Lynn) rose to move a Resolution of a general character as the only one that could express the opinion of the meeting. It appeared to him that the Society of Arts had done its work; the question was, what was to be done by the provincial Institutions?

Mr. **Joynt** (Limerick) thought a great deal of time had been needlessly spent. The endeavouring to find out a specific line of action for all the Institutions in Union with the Society, reminded him of the process by which some persons huddled a lot of patients in a hospital, and endeavoured to cure all their diseases by one remedy. It was quite evident that one Institution was poor, another rich, and that there was a vast difference in their circumstances; and however respectfully he listened to the suggestion of Mr. Chester, he believed it to be wholly impracticable if applied to all the Institutions. He thought, therefore, that they should confine themselves to the simple expression of their agreement with the present course of the Society—thanking the Council for the steps they had already taken, and desiring that they might be continued. No doubt the opinion of the Conference was what was so ably expressed by Dr. Playfair—that lectures in any Institution or in any locality would be of very little value, unless a preparatory and systematic mode of instruction were given to the parties to be benefited by them. In that way alone, sound knowledge could be disseminated amongst the members resident in any locality. He trusted that these were the principles which the Conference would support.

Mr. Chester said the Council would no doubt be perfectly willing to go on as before, and do the best they could, if that was the wish of the meeting; but what he was very desirous that the Conference should not do was, to pass a resolution that the Society of Arts should simply publish a list of lecturers.

Mr. Jones (Epsom and Ewell) supported the Resolution. He did so because he believed it embodied a vote of confidence in the Committee, and expressed all that could be done on the present occasion; namely, the fullest confidence in the labours of the Council, sympathizing with them in the innumerable difficulties which surrounded the question of lectures, and desiring them to issue, as before, a list of subjects as suggestions, the Institutions forming themselves into circuits, and jointly reporting to the Society of Arts the subjects they required and the terms they could afford.

Mr. Coningham (Brighton) said the whole question might be summed up in a very few words. Two things had to be contended with: want of funds, and the difficulty of co-operating. The second point was a troublesome one. There appeared to be a sort of jealousy of central authority; but he was convinced that if there were a satisfactory understanding between the central and local Institutions, a very important benefit would be derived. Because small Institutions in Yorkshire had not succeeded in carrying out the co-operative principle, it was no reason why the larger and wealthier Institutions connected with the Society should fail in doing so. He was confident, from his experience in Brighton, where the lectures had been attended, on an average, by 500 people, and had, he believed, quite covered their expenses, that in the larger towns a most efficient system of lecturing might be organized.

Dr. Hudson (Manchester) said that with reference to the Union of which he was himself the founder, comprising the four counties of Northumberland, Cumberland, Durham, and Westmoreland, in all those counties lecturing as a general system had passed away, and that it was entirely useless for the Council to fritter away their time in endeavouring to supply lecturers. But there was a very great and a growing want on the part of the young working men in the Mechanics' Institutions, to have good lectures, provided they could be carried out in a pleasant and amusing, as well as in an instructive manner, and they could obtain an extemporaneous lecturer, who could speak at once to their capacities. So that although the lecturing system had passed away, if they could begin again, and do as they had once done with Dr. Lardner—if men of such transcendent talents as Dr. Playfair could be secured to go and lecture at those Institutions, he (Dr. Hudson) was quite sure that a new taste would be created.

Mr. James Boorne (Reading) said the call for Lectures had evidently passed from one county to another, for there was certainly a great demand for them in the place from which he came. The lecture courses there had not only been the main-stay of the Institution, but had also brought a large addition to its funds. Dr. Booth had said, "What is it you want?" There was a saying that lecturers were like ginger-bread nuts,—they could not be tried before they were bought; if, therefore, lecturers could go to the various Institutions endorsed by the Society, it would be of great advantage to them. They wanted the Society to do with lecturers as it had done with books,—to buy them at wholesale prices, and distribute them amongst the constituents. If he might mention names, there were such lecturers as Mr. Dawson and Mrs. Balfour, who were popular at Reading, in different senses. One lecturer might be exceedingly popular, and yet not bring so much money into the exchequer as another who was not quite so popular; one might be popular with the members, and the other with the community at large, who would on his account come to the Institution, and add to its funds. It seemed to him that the Society of Arts could do as the Freehold Land Societies had done,—buy up the lecturers wholesale, so that instead of paying a competent lecturer three or four guineas, the Institutions might secure his services for something like a guinea and his expenses.

Dr. Prior Purvis (Greenwich) said, his experience of lecturers very much agreed with that of the last speaker. The Institutions required something of a certificate of character with the lecturers. What was generally wanted, was a series of lectures; but there was a great difficulty in obtaining them, because there were no means of knowing the character of each lecturer. The opinion was usually taken from private, and also from newspaper reports, which were frequently very fallacious; so that every second or third lecturer was often found quite the opposite of the Committee's expectations, and this gave a degree of coldness to the remainder of the course which it required three or four months to get rid of before the members were in a disposition to go and hear another stranger. This was, no doubt, to be attributed, in a great measure, to a want of confidence between one Institution and another, in giving characters to the lecturers, which often misled those by whom they were engaged.

Mr. Hemingway Harris (Mayor of Cambridge) said, he had wished to second the motion of the gentleman behind him. One gentleman had observed, that a good deal of money had been frittered away in lectures. Such being the case, it appeared very desirable that, as there was a growing interest in lectures in some parts of the country, the money should no longer be frittered away, but be expended in a proper direction by means of the Society, so that the Institutions might really receive their value for their money. The Institution which he represented was, perhaps, rather peculiarly situated. He had occupied the position of its Hon. Secretary for twenty years. At the commencement of that period, there were many professors in the University who granted their assistance; but when the Institution was thought to have got out of its leading-strings, the professors gradually retired, and it was now altogether without lectures. The members were, however, very anxious for them, and would do all they could to support them.

The **Chairman** said, that as the Conference had been upwards of an hour and three-quarters on the subject of lectures, and thirty members had uttered their opinions on it, almost all centering on one point, which was, that Institutions generally desired to have lectures, and were anxious that the best possible arrangements should be made for that purpose, he thought that perhaps it would not be considered ungracious if he submitted to the meeting a resolution which, without disparagement to the three or four which had been proposed, might be found to meet the case. He believed he might say that the Council, and the Institutes' Committee, would do their best to make the arrangements which had been desired. He would just glance at one or two points that had been mentioned. Some had imagined that the lectures could be promoted by an annual grant; but he thought that, in their circumstances, an annual grant, whether from Government or elsewhere, would be most detrimental. Another gentleman had suggested that the Society should squeeze the railways; but he considered that would be equally degrading and impracticable. Another had intimated, that it was hopeless to expect the people to pay for the lectures; but surely a labourer, who had by elementary instruction been enabled to appreciate them, would not object to deny himself the price of a pint of beer, which from an audience of 500 would pay a first-rate lecturer.

The following Resolution was then moved by Mr. R. W. **Kennard**, of Falkirk; seconded by Mr. **Henry Edwardes**, of King's Lynn; and carried unanimously:

> "That this Conference do express its confidence that the Society of Arts will make the best possible arrangements for facilitating the supply of Lectures to the Institutions in Union; and does not deem it expedient to attempt to define the modes by which such arrangements should be made."

### V.—CLASS INSTRUCTION.

The **Chairman**, in introducing the next topic, the importance of establishing classes for instruction, said he believed it could be shown that the system had been in some cases the salvation of the largest Institutions.

The Rev. J. **Saul Howson**, M.A. (Liverpool), said that if lectures were turned into class-instruction, and made educational instead of merely amusing, he thought they would instantly become useful. He cordially agreed with Dr. Playfair in the importance which he attached to elementary instruction, to prepare the people for scientific lectures. If they wanted the fire to burn they must light it at the bottom. He could bear out an assertion which had been made, that the schools of the Mechanics' Institution in Liverpool had been pre-eminently useful.

Mr. W. H. I. **Traice** (Leeds) said he was rather surprised that two questions, so closely allied as the present and the preceding, had not been amalgamated. The whole of his experience of Mechanics' Institutions, extending over a period of twenty years, boy and man, was, that a signal defect in them had been the not making it essential that every one who joined them should either give proof that he already possessed a certain amount of elementary instruction, or be willing to enter upon it. If the Society could make arrangements for this purpose, by devising some plan for organizing normal schools or otherwise, there would be in almost all the Institutions the means of paying for it, though not at first perhaps all it was worth. In the Leeds Mechanics' Institution there was a class of about 150 mill-hands, who certainly did not come in the neatest trim, though it was hoped they would soon learn to do so; they paid their 6*d*. every fortnight; and he regretted that the Institution could do no more than take advantage of the teachers in the day-school, who gave them instruction in reading, writing, and arithmetic in the evening. The class was not advertised, for if it were they would not know what to do with the applicants for admission. He was quite convinced that if they went on with this elementary instruction, and made the people believe that reading and writing were only the means of learning something more, more good would be done than could possibly be done by lecturing. A lecture might occasionally be useful as a stimulant; but the real work of instruction must be done in the class: and this must be the starting-point, if Mechanics' Institutions were to accomplish the purposes for which they were designed,—to aid the mechanic in his trade, to elevate his position, and to make him a wiser, a better, and a more useful member of society.

Mr. **Gowing** (Ipswich) said he cordially agreed with the remarks of the last speaker. In the Institution with which he was connected they were unsuccessful for a time; but during the last two years they had been perfectly successful in procuring competent teachers, and also a constant attendance at the classes. But they had suffered from the want of funds. It could not be expected that teachers would come forward quite on the voluntary principle, though the small fee of 6*d*. had been sufficient to secure for two or three of the classes a gentleman who understood eleven or twelve languages, and was competent in several branches of science. The members of the Institution paid 10*s*. a year; 2*s*. 6*d*. extra was charged for classes, and non-members were admitted to them for 5*s*. The Institution could support itself in every other respect, but it was unable to furnish the additional sum required for carrying on this department. The expenses were 50*l*.; whereas they could not obtain more than half of that sum; consequently, he did not see how they could pay their way with the present attendance, except from some extraneous source.

Mr. **Chester** thought every gentleman at all conversant with education must be aware that the real stiff work of education was to be done more in the class-room than in the lecture-room; but at the same time he felt perfectly convinced that lectures, even desultory ones, were really useful, if too much were not expected from them. In a large number of Institutions it had been found quite impossible to maintain classes; he had found it so in his own Institution. But he rose principally for the purpose of saying that he hoped means would be found, not only of improving the status and generally developing and increasing the resources of the Institutions, placing them in a position in which they could better deal with these matters, but that the Society would be able to offer something more nearly approaching to the character of a direct award to those who attended the classes.

Mr. **Madeley** (Derby) suggested that the Society might possibly, at some future period, render great assistance to various Institutions by providing them with masters for the classes,—men of talent that they could afford to pay.

Mr. **Hole** (Leeds) stated that the Committee of the Yorkshire Union had recently obtained statistics from various Institutions, the result of which was that not above one-fourth of those from whom they obtained the statistics were receiving class instruction, and of these, four-fifths were receiving elementary instruction. He might mention another—the Huddersfield Institution was frequently pointed at in Yorkshire as the best in the whole country, except, perhaps, the Edinburgh School of Arts. In the Edinburgh Institution, about half the income was received from the gentlemen in the neighbourhood; and in the Huddersfield Institution about 150*l.* out of 600*l.* It was the duty of the rich to subscribe towards the education of those who had not received the same advantages as themselves; but unless some means were devised for obtaining funds, the majority of the Institutions could not procure paid masters, and unless they did this they could not depend upon having qualified persons.

The Dean of Hereford said it was quite clear that Mechanics' Institutions throughout the country were not generally prepared to receive any great amount of instruction from lectures under the present system; still, he was of opinion that the reason they had hitherto failed had been from the want of elementary instruction.

Mr. Grant (Dalston) said he had been connected with three or four Institutions, and he had found one particular class succeed in a particular neighbourhood, and another fail. He thought that if classes for instruction were provided, suitable to the particular circumstances of the members, they would be very ready to join them.

Mr. W. Nichol (Liverpool) wished to state a little of his experience in reference to an evening-school connected with the Liverpool Mechanics' Institution, where 400*l.* or 500*l.* a year was paid in salaries to teachers. It was for a long time the practice to admit to that school the apprentices and sons of members, at a payment of 5*s.* per annum. The school met four nights a week, for two hours each night. The attendance was very irregular, sometimes not more than one in four; and the Institution did not obtain near the amount necessary to meet the expenses. Some time ago, in looking over the affairs of the Institution, they determined that this state of things should no longer be maintained. They looked to the characters of those who attended, and formed a set of classes for instruction in reading, writing, and arithmetic, at 2*s.* 6*d.* a quarter, and another for the higher branches at 5*s.* This plan had been attended with great success.

Mr. Buckmaster (Battersea) said, every one must feel the necessity of having men to manage the elementary schools who were properly qualified for their office; for it was well known that many were ignorant of the simplest questions of physics who could solve readily the most difficult mathematical problems.

The Rev. W. Taylor Jones (Romford) said he had found elementary classes of great service among the working men in his neighbourhood.

The Rev. H. Fearon (Loughborough) said he thought a general Resolution like that suggested by the Dean of Hereford was the only one that could be passed; for if the Society of Arts could not assist the Institutions much on the subject of lectures, they could not on that under discussion, which was one of the most important matters with which they were concerned. Many lecturers came to the country Institutions who were utterly unintelligible to the audience. The evil could not be remedied until the labouring people were better educated. There were two Societies in Loughborough, one for the upper tradesmen, and the other for the working classes; the first was well attended, while the second was comparatively deserted, though free admission was offered.

The Chairman, in putting the Resolution, said that although perhaps the Society of Arts, as a central Institution, was not able to do much in the way of providing efficient schoolmasters, there was another central Institution, which they were properly very shy of,—namely, the Government — that had taken steps for training teachers, and he would show how gentlemen might obtain assistance in that direction if they were so disposed. The Dean of Hereford could tell them of a master who had been sent there by Government, and who really made an adequate and handsome salary. The Government had no more to do with him than to guarantee that he should not be a loser by the experiment, giving him 5*l.* in his pocket, and paying his travelling expenses upon condition of his furnishing a report. This plan had been tried at Durham, Swansea, Caermarthen, Dudley, and various other places; and Institutions might avail themselves of the same assistance. In fact, they might have some of the advantages without going so far as to ask for a master. The department with which he was connected had collected together materials for teaching drawing and colouring, and were collecting, through Dr. Playfair, materials for teaching physical science. These could be obtained at half the cost price. This was a privilege which he believed would only last this year, and the supply must now stop for six weeks on account of the very large number of those who wished to take advantage of it.

Mr. Joynt (Limerick) said the system which had just been propounded was wholly opposed to the National system in Ireland. He did not see why instruction in Art should not be given to the pupils in the National-schools on the very same terms that they were taught the common branches of knowledge. He believed the true dignity of any Institution was its being self-supporting. The system which had been laid down would, however, if carried out with any severity in Ireland, prevent the full development of a taste for art among the humble, and especially amongst the middle and upper classes, who were as much in need of it as the lowest.

The Chairman said the Government was prepared to send masters into the schools referred to by the last speaker. With respect to the town represented by him, it had done much on the self-supporting principle, and had prospered much more than the other Irish towns which had acted on the subsidized principle. The same might be said of Waterford.

The following Resolution was then moved by the Very Reverend the Dean of Hereford, seconded by Mr. F. H. Bastard, of Blandford, and carried unanimously:

> "That the infusion of science and art into elementary instruction is required by the people generally, and is desirable for the ultimate success of Mechanics' Institutions, which could then advance science and art more efficiently by systematic class instruction."

Subsequently the following Resolution was moved by the Rev. John Saul Howson, A.M., of Liverpool, seconded by Mr. James Hole, of Leeds, and carried unanimously:

> "That it is desirable that the training-schools of this country should introduce into their courses of study a more thorough knowledge of the natural and physical sciences, and a system of instruction in art; and that the Council of the Society of Arts be requested to forward this Resolution to the President of the Council of Education, and to the various training Institutions."

Mr. Chester said he was not there to speak for the noble Lord, the President of the Council, nor to represent the Government in the matter; but having been, ever since the establishment of the Committee, one of its officers, he naturally felt a deep interest in the subject. The meeting would be greatly mistaken, if it supposed that there was, or ever had been, any disinclination of the Committee to advance the object which had been referred to. It was not the policy of the Committee to endeavour to control and direct the education of the country, but simply to supplement and stimulate local efforts, in the way of suggestion and pecuniary assistance. Certainly, it had not made the progress which he should desire to see it make, but it had made some progress; and he could not allow his friends, Mr. Cole and Dr. Playfair, to run away with all the credit, because, long before their Board was thought of, that was an object which the Committee of Council had in view. It had been making efforts during the last few years, not only indirectly through the reports of inspectors, but directly through the training schools themselves. The thing had already taken root in a great many of them, and some good effects had been produced.

The Rev. A. BATH POWER, M.A. (Norwich), said he appeared not only as a representative of the popular Institutions of the city of Norwich, but as the principal of one of the training Schools indicated in the last Resolution. He had conducted its affairs for thirteen years; it had carried out their arrangements under the Committee of Council on Education, and was about to extend its operations in many important particulars. In the boys' school with which he was connected, more particularly, physical science formed part of the daily routine. The system was not thoroughly carried out, for want of the facilities that had been named; but he trusted they would soon be able to go farther into the practical instruction.

### VI.—STATISTICS.

The CHAIRMAN said, they now came to the question of statistics, which was one in which the interests of the Society, as well as the Journal, were much concerned. The Journal was started mainly with the view of enabling the Institutes to have an organ for communicating their opinions; but he was sorry to say that it had been very tamely responded to; and unless it were better supported, the Society of Arts could not be expected, out of its Exchequer, to pay some 200*l.* or 300*l.* per annum for an organ which was not appreciated. Its circulation would depend upon its merits; if it were made a popular thing the public would have it. But if it was not wanted by the members it would be discontinued.

Mr. GOWING (Ipswich) said he thought the Journal so dry that there was very great difficulty in getting through it, unless some specific information were required. If it had been managed like the *Athenæum*, or any Journal intended to pay, it would have been much more useful.

The Rev. J. SAUL HOWSON, M.A. (Liverpool), had taken in the Journal from the first number, through seeing it advertised, before he became a member of the Society. He had since read it very diligently, and it had been of the greatest practical use to him; indeed, he did not know where else he could have obtained a great deal of the information he had picked up. He thought the Council should not be discouraged; it was not to be expected that any periodical should make its way immediately; but he could not help saying that it would be a very great disaster if the Journal were discontinued. The specific character of its information certainly ought not to be considered an objection.

Dr. HUNTER (Margate) said he believed the Journal was fully entitled to their most cordial support, diffusing as it did the most valuable information. He might refer especially to the very able discussions on Photography, and the very elaborate history of cotton and paper printing which had recently appeared. He was quite sure that it contained a degree of information which could not be obtained, as far as he knew, from any other source.

Mr. COLEMAN (Wandsworth) said the members of his Institution read the Journal with a great deal of interest and pleasure; and he could only wish that other journals were read with equal satisfaction. While that lay on the table well marked, and apparently well read, by its side lay the *Mechanics' Magazine* hardly touched. He thought the reports of the lectures and meetings of various scientific societies might be increased with advantage. The Friday evening lectures at the Royal Institution were particularly interesting.

Mr. SQUAREY (Salisbury) said it would be a source of great regret to the members in his district if the Journal were discontinued.

Mr. W. H. J. TRAICE (Leeds) said it was always a difficult matter, as the accounts of the various Institutions were frequently kept by honorary officers, to procure the statistics more than once a year; but he believed they might in many instances be obtained quarterly. They might get the printed reports, and apply specially for any further information that might be required. He was very much pleased to hear the tone which the conversation had taken on the subject of the Journal. When it first appeared he suspected that it might not be possible to find any proceedings of interest to carry it on; but he rejoiced to say that material had been obtained in connection with the Society of Arts, which made the Journal so interesting as to induce all persons to read it, while it gave at the same time such information as was required by the members. He was not very anxious to see from week to week reports that Mr. A. B. gave a very interesting lecture, the Mayor of so-and-so in the chair, and the audience were very deeply impressed by the experiments; he was one of those who did not profess to be much exhilarated by statements of that kind, therefore he would be satisfied with a small number of them, and he hoped the Society would only refer to such lectures as were really important.

Mr. BUCKMASTER (Battersea) said he did not think the Journal had been appreciated so much as it ought to have been, because it was so cheap. The members not only received a copy themselves, but the Institutions with which they were connected received one as well. If the individual or the Institution had to pay some sum, say 5*s.* a year, for the Journal, it would be more thought of. With regard to the reports of lectures and meetings, he believed they were generally interesting to the members in the particular localities in which they took place.

### VII.—LEGAL POSITION.

The CHAIRMAN then introduced the next subject, which he considered of great importance—the Legal Position of Institutes.

Mr. CHESTER said the subject was not only important, but one of very considerable difficulty. He wished the meeting had been as numerous now as it was when it first commenced. It was the intention of the Institutes' Committee to prepare and lay before them the heads of a Bill intended to remove some of the evils of which the Institutions complained, in reference to their legal position. They had before had the subject so well ventilated by Mr. Tufnell, that it was thought to be of advantage to have his opinion at the present time. Mr. Tufnell concurred with the Committee in thinking it expedient that the subject should be brought before a Committee of the House of Commons, and fully investigated; but he hesitated to make the motion himself, because he thought it expedient that the Chair of the Committee should be taken by a lawyer; he undertook to consult with his friends, and report to him (Mr. Chester); but owing to the illness of Mr. Tufnell, which they all lamented, no report had come to hand. The Committee had presented a Report on this subject (*Vide* No. 11 of the JOURNAL, page 124), which referred to the exemption of local rates, legal disabilities with regard to building-lands, the laws of mortmain and partnership, and the position in which the Institutions stood in reference to the Act relating to disorderly houses. He did not know whether, with Prince Albert at their head, their's was not an illegal combination. Their position was not very perilous, for no proceedings could be taken except by the Attorney-General, and no Attorney-General would be likely to commence them. With regard to the exemption from local rates, it seemed to him to lie rather in the way of the other two points. It was thought that it would be expedient before they went to Parliament to obtain facilities for conveying and holding land and buildings for the uses of the Institutions, and for setting them free from those penalties to which they were liable, that they should clear up the question of local rates. They were all aware that it was the intention of the Legislature apparently, so far as any intention could be gathered from an Act of Parliament, to exempt Societies from local rates; but that Act was attended with considerable embarrassments, and Societies, which were probably intended to be exempted, were not exempted. This subject of exemption, however, was one rather for the Institutions themselves to determine than for the Society of Arts; and they particularly invited discussion in the Journal, but he believed no communications on that subject had appeared, except one letter, which was written by himself, in which he expressed his opinion that it was not at all for the interest of the Institutions that they should be exempted, and recommended that they should rather make the unusual communication to the Chancellor of the Exchequer, that they were prepared and desirous to forego the exemptions. He thought the real dignity of the Institutions could not be promoted by their putting themselves *in formâ pauperis*. The whole system of exemptions from taxation was altogether unsound and objectionable, and he should be glad to see them taken from all those large Institutions which now availed themselves of them. But he only gave these opinions, of course, individually, and any gentleman would be at liberty to make any remarks upon the subject.

Mr. GAEL (Cheltenham) thought he should betray the interests of the Institution he came there to represent, if he did not express his thorough disagreement with the principles just enunciated. He did not think it necessary to go into the large and general question of exemptions; but if there were any exemptions at all, Institutions such as that with which he was connected should ask to be exempted. If Government thought proper to bring churches and chapels under the rule of taxation, let them do so; but he thought Institutions which had no other object than the improvement of the people, ought not to be allowed to be an exception.

Mr. OPPENHEIM (Jews' and General Literary and Scientific Institution) said, if it was not inconsistent with their dignity to apply to Parliament for Blue Books, and to booksellers to reduce the price of their books, and to lecturers to reduce their terms for lecturing, it could not be inconsistent with their dignity to apply to Parliament for exemption from local taxation. His Institution would consider it a very great boon. Nearly every one of them had been charged in every petty court in the metropolis; and they were now incurring 20*l*. to 35*l*. per annum more than they incurred many years ago, since the decision in the Greenwich case.

Mr. HALSALL (Bristol) said the local rates in his district amounted to 6*s*. in the pound, and the Institution, when finished, would be rated at about 200*l*. a year; this made a serious item, and led to the expenditure of funds which would be otherwise employed in conferring additional benefit on the class of persons for whom the Institution was provided.

Mr. VALENTINE (London Mechanics' Institution) said, perhaps no Institution had had more to contend with in this matter than that with which he was connected. They used to compound with the parish; but after the decision in the Greenwich case, they had to pay a much larger sum. The benefit of the exemption would be to them greater than that which would be conferred by the reduction of the stamp or any similar duty.

The Rev. H. FEARON (Loughborough), said he thought the time was coming when all exemptions would be viewed with more and more suspicion. It was extremely difficult to frame an Act of Parliament to include certain exemptions, and not to include others which were never meant. No doubt if some of the Institutions which had been referred to were exempted, the others should be too; but the whole of the exemptions ought to be done away with.

The CHAIRMAN said there might be something which it was desirable to go to the Legislature for,—the legal position of the Institutions with respect to their property, for instance; but if they went and asked for something the policy of which was doubtful, he thought the case might be prejudiced.

Mr. TRAICE (Leeds) said they were very well contented with the Act as it stood; they could take care of their property very well, if they were exempted from the rates. He had always felt that there was a manifest injustice in anything which took away from the operation of universal law; but in reference to what had been said about going to the Chancellor of the Exchequer, he might be allowed to observe, that the exemption had nothing to do with the Chancellor of the Exchequer,—it merely related to the local rates; and though that was not the best mode of contributing, it was no more than right that the public should contribute somewhat towards the support of the Institution in their neighbourhood.

The Rev. W. TAYLOR JONES (Romford) said, in many instances Institutions had been exempted by going through the regular routine at the Quarter Sessions, and afterwards some individual feeling himself aggrieved, had raised the legal question, and they had been obliged to pay not only the present, but, in some cases, the back rates. He had been told by the Recorder, after a trial of this kind, that the keeping newspapers to read took away from the strictly literary and scientific character of the Institutions, and unfitted them for the exemption.

Dr. HUDSON (Manchester) said although he agreed with Mr. Chester, that the Institutions should not have exemption, still as the representative of a large body he was bound to express their opinion, which was that some steps should be taken for a legal examination into the subject; and he believed the only way this could be done would be by a Parliamentary Committee.

The CHAIRMAN said that it was quite clear that it did not matter what resolutions they passed upon the subject, the House of Commons would no doubt take its own steps. The only question was, whether they should pass those resolutions which would be likely to lead to the object they had in view. He did not know whether as an individual he might say that it was quite certain they would have a Parliamentary Committee; and they might as well perhaps get all the advantage they could by asking for that which was coming on, rather than going at once to the exact proposition. However, that was for the meeting to consider.

Mr. **Hole** (Leeds) agreed that the whole system of exemptions was wrong, because it was a difficult matter for even the longest-headed lawyers to decide which came under the exemption, and which did not; but knowing as he did that the Institutions were pinched for want of means, if it would be the means of assisting them, he would be very willing to give up the principle.

Mr. **Bramwell** (Mayor of Durham) suggested whether it was prudent to enter into the matter, as there were several Institutions that were really considered as exempt.

Mr. **Noldwritt** (Walworth), said their worthy friend, Mr. Chester, had asked, Why should Institutions seek to be exempt from taxation? It was because they had already paid a rate, and should not be called upon to pay a second. No doubt many present could remember the time when the exemption was first broached, he believed by Lord Brougham, about twelve years back: it was then proposed that it should extend to Government taxes; and the Bill also gave the Institutions, he thought, a standing in law, and secured them their property. For some reasons, which he could not recollect, that Bill was not introduced; but some six or seven years afterwards the present act was passed, which, as they had heard, was in many instances totally inoperative, and had always been open to cavils and objections. It seemed to him that they could go with better grace to ask for the repeal of that law, than the repeal of the stamp taxes and advertisement duty, which had already been recognised. He thought the experience of by far the greater number of Institutions, not only in London, but throughout the country, would show, that unless those who were now subject to taxation had some hope of immediate relief, the disruption and close of many of them would take place.

The following Resolution was then moved by Dr. **Hudson**, of Manchester; seconded by Mr. **Joseph Ashworth**, of Pendleton; and carried:

> "That it be remitted to the Council of the Society of Arts to endeavour, if deemed advisable, to obtain a Parliamentary inquiry into the legal position of Literary and Mechanics' Institutions, with reference to 6 and 7 Vic., cap. 36, and the other Acts recited in Appendix IV. of the Report presented to this meeting."

The **Chairman** said, the Conference had been sitting five hours and a half; 106 speeches had been made, and each had occupied on an average three minutes and a half. He thought that was a statistic worth recording.

Votes of thanks to the Chairman and the Council of the Society of Arts were then passed, and the proceedings terminated.

## THE DINNER.

After the Conference about 250 gentlemen, Members of the Society of Arts, Representatives of the Institutions in Union, and other friends of Education, sat down to dinner at the Freemason's Tavern, under the Presidency of the Right Hon. **Earl Granville**. Among the company were Lord Radstock, the Very Reverend the Dean of Hereford, the Rev. the Archdeacon of Hereford, Mr. W. Tooke, F.R.S.; Mr. Charles Knight; Mr. S. Holme, Mayor of Liverpool; Mr. Sopwith, F.R.S.; Mr. Ewart, M.P.; Mr. Hutt, M.P.; Dr. Lyon Playfair, C.B.; Mr. Warren De la Rue, F.R.S.; the Rev. Dr. Booth, F.R.S.; Mr. John Bell, Mr. Winkworth, Mr. Harry Chester, Capt. Owen, R.E.; Don Manuel de Ysasi, Mr. Robert Hunt, Mr. R. D. Grainger, F.R.S.; Mr. George Lowe, F.R.S., &c., &c.

The cloth having been removed, the **Chairman** proposed the health of "the Queen," which was most cordially responded to. The **Chairman** then gave the health of "His Royal Highness Prince Albert, President of the Society of Arts, Manufactures, and Commerce, and the rest of the Royal Family;"—in doing which he referred to a speech recently made by Prince Albert on a similar occasion to the present, when His Royal Highness expressed the hope that the education of the Royal children might be such as to fit them for the position they were destined to occupy, as well as to realize the fond and almost parental expectations of the British public.

The Very Rev. the **Dean** of **Hereford** then proposed "Success to Instruction in Science and Art." He said he believed the success of education would very greatly depend on the instruction given in science and art. He did not wish the clergy to neglect the religious instruction of the people, but he thought they might often bring their instruction more to bear than they had done upon the realities and utilities of life. (Cheers.) He had done his best to establish self-supporting schools in his neighbourhood, and he had not laboured in vain. However some persons might consider it a delusion, he thought it one of the principles of social economy that education should be paid for by those who received it, and he was glad to find that principle being more and more recognised. (Hear, hear.) He believed the cause of education had greatly progressed of late years, and he attributed no small portion of that progress to the proceedings of the Committee of Council, especially in reference to the wholesome system of Inspection which it had instituted. The Inspectors, he thought, did not always pay so much attention to science and art in the different schools as they might do, but he trusted they would pay more attention to those points in future. Many persons were disappointed with the introduction of subjects of that kind into schools, expecting too great results in too short a time; forgetting that the progress of education must necessarily be slow. The Very Reverend the Dean then mentioned the case of a youth instructed in one of the schools under his care, who when employed in the Excise-office in London, attracted the attention of his superiors, and was then sent to the London University, where he carried away several prize medals, and had the prospect of gaining several others. He argued thence that a great deal of talent was lost to the country for want of early education. He concluded by proposing the toast, and coupling with it the name of Dr. Lyon Playfair. (Cheers.)

Dr. **Playfair**, in acknowledging the toast, said he thought there was an ample guarantee in the proceedings of the week that the text of the toast was likely to be realized. Formerly they had heard of meetings of mayors for the purpose of consulting how they might retain their corporate privileges against baronial aggression; but it was a novelty of modern times to find mayors meeting for the purpose of promoting art and science. In 1850 there was an assemblage of mayors in the Mansion-house for the purpose of promoting the Great Exhibition; and in the present year, as a fitting sequel, they had met to consider how they might best raise the condition of the industrial population. The meeting held that day was, he thought, a remarkable one, from the unanimity with which it had pronounced on the absolute necessity for infusing science into elementary education. And it was a further matter of congratulation that the noble Lord in the chair, who was President of the Committee of Council on Education, took such enlarged views with respect to science and art. (Cheers).

The CHAIRMAN proposed, "The Literary and Scientific Societies, and Mechanics' Institutions, of the United Kingdom; and prosperity to the Union;" coupled with the health of Mr. Chester. He found that these important bodies now exceeded 850 in number, of which 270, comprising about 84,000 members, were in union with the Society of Arts. He said he had been struck by a comparison of the sentiments entertained in the present day, on the subject of education, with those formerly expressed in the House of Commons, where, on one particular occasion, a proposition for some measure of education by the people was rejected by an enormous majority. The only arguments advanced were, that as we did not make all men tailors, or all shoemakers, it would be absurd to teach all men to read and write; and that education generally tended to increase rather than diminish poverty. (Laughter.) The opinion of the present day was the reverse of that. (Hear, hear.) It was no longer believed that a man would make a coat or a shoe, or dig a furrow in a less workmanlike style because he happened to know how to read and write; or that he would be much inferior if he knew the quality of the cloth, or the peculiarity of the leather, or the chemical analysis of the soil upon which he had to labour. (Cheers.) The progress of education in this country was to be seen in the increase of elementary schools, and in the higher kind of instruction imparted in them; in the improved character of the press; in the description of books sold at railway stations, and other public localities; and in many other equally indubitable marks of progress. Reference had been made to the desirableness of introducing into elementary schools under Government inspection, some increase of instruction in Scientific and Artistic subjects. That was a feeling in which the Government entirely participated; and no exertion should be wanting on his (the Chairman's) part to endeavour to carry it out. They anticipated no difficulty in the matter, but rather cordial co-operation on the part of the schoolmasters generally. (Hear, hear).

Mr. CHESTER, in acknowledging the toast, said he had great reason to hope that the condition of Mechanics' Institutions was one of increasing prosperity; and he attributed the improvement to some extent to the Union established by the Society of Arts, but still more to the great progress which public opinion had made in the matter of education. There appeared at one time to be an apprehension among some of the Institutions who were invited to join the Union, that the Society of Arts was going to take the government out of their own hands, and transfer it to John-street, Adelphi; but he hoped that apprehension was now entirely dispelled; for the principal part of the business would not be transacted by the Society in London, but would be left to the country Societies, who would communicate the results of their experience to the Council, by whom those results would be turned to the advantage of all the Institutions in the Union. He thought the Society of Arts would greatly benefit from the Union. It had required some medium of communication with the country; and this was now, of course, facilitated by having entered into connection with such large and intelligent bodies as were scattered throughout the country in the form of Mechanics' Institutes. Thus, he conceived the advantages to be mutual, and he trusted they would be increasingly so. (Cheers.)

Mr. HUTT, M.P., proposed, "Prosperity to the Society of Arts," coupled with the health of Mr. Winkworth. No one, he said, could have witnessed the efforts of the Society in the cause of education during the past year, without wishing God-speed to such an Institution. (Hear, hear.) The dissemination of a knowledge of science and art amongst a people devoted to productive industry, must always be a matter of deep interest in a commercial point of view; for the manufactures of a country would have their value in the markets of the world according as they were distinguished by correctness in execution and by artistical talent. But the Society had claims upon the public attention in a moral point of view. In a country so devoted to the accumulation of money, it was of the highest importance that people should have other aims and other pleasures of a less selfish and more refined nature, to enable them to gratify the higher instincts of their being; and whatever tended to lead away from pursuits of a material character to the quiet pleasures of intellectual gratification, was a real and substantial gift to every human being who received it. (Hear, hear.)

Mr. WINKWORTH, in replying to the toast, said, the Society of Arts was now in its hundredth year; yet, paradoxical as it might seem, though it was so aged it was younger than ever. (Cheers and laughter.) It had availed itself of all the appliances furnished by invention and discovery; and the results of its labours were patent to the world. To its labours were in a great measure due the Exhibition of 1851, as well as others which had followed in its train. It had a variety of objects to carry out, and he had no doubt that success would continue to crown its efforts if it continued in the same course that it had latterly followed, which had already been the means of very largely increasing the number of its members.

Mr. CHARLES KNIGHT, who was received with long and loud continued cheering, proposed, "The health of the Representatives of the Institutions in Union with the Society of Arts." He said he associated the present elevated and prosperous condition of the people, politically and otherwise, with the progress of education. As people advanced in the knowledge of science and art, they could not but advance in their social condition. This could not be calculated by statistics, it could not be tested by figures, but by every man's experience; and he would appeal to all present whether their humbler neighbours in their various localities were not greatly advanced, mentally, socially, and morally, and altogether improved in the ordinary courtesies of life. Eighty or ninety years ago Goldsmith wrote in his "Traveller" these lines, as an eulogium upon Englishmen:

> "Pride in their port, defiance in their eye,
> I see the lords of human kind pass by."

Would that be considered complimentary to any class of Englishmen in the present day? Who now went about with pride in his port, and defiance in his eye, asserting his supremacy over all around him? Further:

> "Fierce in their native hardihood of soul,
> True to imagine right beyond control."

What Englishmen were fierce now? They had the "native hardihood of soul," that made them win Percy, and Agincourt, and Waterloo; but they were not fierce: it was the characteristic of true courage to be gentle. They were certainly "true to imagine right;" yes, and they now had true liberty; while 100 years ago they had but the shadow,—they did not cherish that loyalty that was love, or that liberty which was respect for law. (Hear, hear.) This great change in the people was doubtless owing to the progress of education, and in that work the Society of Arts had taken an honourable and a useful part, which entitled it to the gratitude of all men. Mr. Knight concluded by proposing the toast, coupling with it the name of Mr. Ewart, M.P., on whom he passed a warm eulogium for his disinterested efforts in bringing about a Parliamentary recognition of the importance of free libraries for the people.

Mr. EWART, M.P., acknowledged the toast, and expressed his sense of the importance of the Union of Mechanics' Institutes in connection with the Society of Arts. There was, he said, at first, a not unnatural jealousy that the Society would realise Pope's line, and

> "Be like Aaron's rod, and swallow up the rest;"

but the Union was now shown to combine the greatest freedom of action with the vast advantages which must always flow from a central system of operation (Cheers).

The CHAIRMAN proposed the health of "Mr. Hole, the Secretary to the Yorkshire Union of Mechanics' Institutes."

Mr. HOLE briefly acknowledged the toast, dwelling on the advantages of the Union for affording the benefits of centralization, whilst at the same time local action was preserved.

Mr. R. A., SLANEY, in proposing the health of Lord Granville, the Chairman, remarked that it had been his lot for many years to look at the condition of the working classes, and he was convinced that the welfare and progress of this great country depended entirely on the progress of education among the vast masses of the people. He referred with pleasure to the recent improvements in the dwellings of the working classes, and desired to see education advancing in a similar ratio. He had now the pleasure of proposing the health of one who had for a long period been an advocate of education in this country, and had done much for it—of one whose public life and private virtues alike entitled him to their regard. He begged to propose the health of their noble Chairman, Lord Granville.

The toast was drunk with all the honours.

The CHAIRMAN, in responding, referred to the recent efforts in the cause of education made by the Lord Mayor of the City of London, who thought that the order, peace, and good conduct of a people could be better promoted by the advance of education than by the most carefully arranged police regulations. In proposing the health of the Municipal Representatives, he had great pleasure, in the absence of the Lord Mayor of London, in coupling the toast with the name of the Mayor of Liverpool.

Mr. S. HOLME (Mayor of Liverpool) said it was only a few minutes since he came into the room, and he was therefore not prepared, to do justice to such a toast. He felt happy, however, in having an opportunity of responding on behalf of his friend Alderman Challis, Lord Mayor of London, and especially on an occasion like this, connected with a Society aiming at such noble purposes. He understood they aimed at industrial education; and this was an industrial country, depending for its greatness on the energy of its industry and its commercial enterprise. But as he walked through the streets, he still had to look upon masses of ignorance which he wished to see removed; and if he had any influence in his public capacity, he felt it would be his duty no less than his privilege to aid in removing it. The mechanics of this country had a claim upon their attention. He would ask, as a mechanic, who were the men who had carried out the real reforms of the present day, whilst the Legislature had only been talking about reform? He meant those reforms which really moved society, and he thought it would be at once admitted that it was the skill and enterprise of such men as Watt, Stephenson, the elder Rennie, and others, that had effected the great revolutions which enabled him to transact his business in Liverpool during the day, and rest comfortably in London at night. When he looked at the railways, the electric telegraph, and the harbours of the country, he felt that the working classes had a claim on their attention, and it was because this Society were working in this direction that he wished them God-speed. He wished to see the country progress; and he hoped as Liverpool surpassed London in the tonnage of its shipping, it would also surpass it in mechanical and industrial education. He said this merely in the spirit of generous rivalry, in order to incite London to endeavour to excel in this particular as in others. As they were now brought together as one great family, let them exercise the powers which science had given them for the purpose of benefiting the physical condition of mankind. And they must remember that the mechanics of the present day were not the mechanics of half a century ago; they were advancing, and if the classes above them did not move on, they would be compelled to do so. Talk of stopping education,—why they might as well talk of stopping the Atlantic wave. Government might legislate or not, men would burn for intelligence,—and intelligence they would have, whether those whose duty it was to give it them did so or not. If the higher classes acknowledged the responsibility of their position, if they believed they had duties as well as rights, it was their duty and their right to see that this burning desire should have a right direction given to it, by affording that education, physical and moral, which the people of this country required; such an education as would bind them to the monarchical institutions of the country,—those institutions which would give them civil and religious liberty in the truest sense; institutions headed by a monarch who was worthy to be loved by her people. The higher classes must move if they would preserve their influence: society was a great crowd, and if those did not move on who were at the head, he should be sorry to say they would be trodden under foot,—but they would be regarded as deserters; and as this was the first time he had had an opportunity of speaking in this metropolis, which was looked to as an example of all that was good, he urged on them to set an example worthy of imitation in this matter, and in giving that education to the people for which they panted. He begged to thank them on behalf of the Lord Mayor, and of the various municipalities, for the honour they had done them in drinking their healths.

After a few further observations from the CHAIRMAN, the meeting separated.

## PATENTS FOR INVENTIONS.

THE following important Bill, relating to Letters Patent for Inventions, has just passed through the House of Lords, and was presented to the House of Commons on the 23rd ult. The Bill is intituled:—"An Act to repeal certain Provisions of the Patent Law Amendment Act, 1852, in respect of the Transmission of certified Copies of Letters Patent and Specifications to certain Offices in Edinburgh and Dublin, and to make provision for the printing, publishing, and Sale of Specifications."

Whereas, it is expedient to repeal certain Provisions of the Patent Law Amendment Act, 1852, in respect of the Transmission of certified Copies of Letters Patent and Specifications to certain Offices in Edinburgh and Dublin, and to make provision for the printing, publishing, and Sale of Specifications: Be it therefore enacted by the Queen's most Excellent Majesty, by and with the Advice and Consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the Authority of the same, as follows:

I. Sections Twenty-nine, Thirty, and Thirty-three of the said Act, and the Proviso in Section Eighteen of the said Act directing Transcripts of Letters Patent to be transmitted to the Director of Chancery in Scotland, and such Part of Section Twenty-eight of the said Act as directs that in case Reference is made to Drawings in any Specification deposited or filed under the said Act an extra Copy of such Drawings should be left with such Specification, and such Part of Section Thirty-five of the said Act as directs that certified Duplicates of all Entries made in the Register of Proprietors of Letters Patent should forthwith be transmitted to the Office of the Commissioners in Edinburgh and Dublin, shall be repealed.

II. The Commissioners shall cause true Copies of all Specifications, with the Drawings accompanying the same, if any, and of all Disclaimers and Memoranda of Alterations filed under or in pursuance of the said Patent Law Amendment Act, 1852, to be open to the Inspection of the Public at the Office of the Commissioners at all reasonable Times, subject to such Regulations as the Commissioners may direct; and shall also cause all Provisional Specifications left at the Office of the Commissioners to be in like Manner open to the Inspection of the Public, at such Times, after the Date of the Record thereof respectively, as the Commissioners shall by their Order from Time to Time direct.

III. The Commissioners shall cause to be printed, published, and sold, by the Printer to Her Majesty, at such Prices and in such Manner as they shall think fit, all Specifications and Complete Specifications, with the Drawings accompanying the same, if any, and all Disclaimers and Memoranda of Alterations deposited or filed, or hereafter to be deposited or filed, under the said Patent Law Amendment Act, or enrolled in the Rolls Chapel Office, Petty Bag Office, or Enrolment Office of the Court of Chancery, and by the said Act directed to be transferred to the Office of the Court of Chancery appointed for the filing of Specifications; and all such Specifications, Complete Specifications, Disclaimers and Memoranda of Alterations shall be so printed and published as soon as conveniently may be after the filing or transferring thereof respectively; and the Commissioners shall also cause Copies of all such Specifications and Complete Specifications, with the Drawings accompanying the same, if any, and all Disclaimers and Memoranda of Alterations so printed by the Printer to Her Majesty, forthwith to be transmitted to the Office of the Director of Chancery in Edinburgh and the Enrolment Office of the Court of Chancery in Dublin respectively, there to be open to the Inspection of the Public at all reasonable Times, subject to such Regulations as the Commissioners may direct.

IV. A True Copy, under the Hand of the Patentee or Applicant, or Agent of the Patentee or Applicant, of every Specification and of every Complete Specification, with the Drawings accompanying the same, if any, shall be left at the Office of the Commissioners on filing such Specification or Complete Specification.

V. Certified Copies or Extracts, sealed with the Seal of the Commissioners, of Letters Patent, Specifications, Disclaimers, Memoranda of Alterations, and all other Documents recorded and filed in the Commissioners Office, or in the said Office of the Court of Chancery, shall be received in Evidence in all Proceedings relating to Letters Patent for Inventions in all Courts whatsoever within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, and Her Majesty's Colonies and Plantations abroad, without further Proof or Production of the Originals.

VI. This Act and the Patent Law Amendment Act, 1852, shall be construed together as One Act.

## WORKING-MEN'S READING ROOMS IN CARLISLE.

In the *Household Words* for September, 1851, there appeared an article on this subject, which attracted so much attention at the time, and has been the means of calling several analogous Institutions into existence, that it is proposed to draw from that source a few of the principal facts there given. The Institution referred to has since made much progress.

"In April, 1848, when every ear was daily listening for the great tidings which that period of strange excitement was continually furnishing—in April, 1848, a few poor men, most of them handloom weavers, clubbed their wits together for the means of getting at a daily newspaper. Obviously it was found requisite that they should also club their pennies. The result was, that within the first week after the suggestion had been made, fifty persons had come forward as subscribers of a weekly penny, and a school-room had been lent to them wherein to meet and read their papers. These men were all of the same class; they had originated their idea, and they were themselves managing its execution. Companions multiplied about them; there was formed quite a prosperous little society of men contributing their weekly pennies, and it was resolved, therefore, to attempt the formation of a permanent reading-room, and a committee was appointed to draw up a code of rules. The working-man's reading-room in John-street, Bötchergate, became thus one of the Institutions of Carlisle, and flourished for a few months; then news became less interesting, trade also was bad, members fell off, funds declined, and the experiment would have been abandoned, but for the judicious and well-timed assistance of Dr. Elliot, and other members of the middle classes. These aided the effort of the working-men to help themselves, with advice, and cash, and books; their aid was fairly given, fairly taken, no abandonment of independence on the part of the workmen being asked or offered.

"They began, as we said, in April, 1848, a few handloom weavers, paying a few pennies. In July, 1851, they had 112 members, for whom there were taken in 2 daily papers and 13 weekly papers, besides 15 periodicals; for whose use 718 volumes were arranged on shelves, which had furnished to the members, during the preceding year, 3,000 readings at their own fireside.

"Over this Reading-room and Library, it is a fundamental rule that no man shall exert an influence by holding office or by voting, unless he be a man dependent upon weekly wages for support.

"It is also a rule that any member capable of getting and of doing work, shall be expelled if he leave his contribution for a month unpaid; but in the manly spirit which has guided the whole management of this Society, it is made also a fundamental law, that any member who is out of work, through real inability to get it or to do it, shall be entitled to continue in the enjoyment of the privileges of the Institution, without payment and without responsibility.

"Finally, to save the property of the Society from all risk of dispersion, it is vested in the Corporation of Carlisle."

## HOME CORRESPONDENCE.

### CHRONOMETERS.

SIR,—In accordance with the understanding that I should give my reply in the Journal, concerning the chronometer trials, I send the following for publication.

Mr. Denison observes, that if we take the average weekly rate of each chronometer for the first eight weeks, as shown in the page exhibiting the order of temperature, we shall have a very good indication of its going in the extreme cold; and in like manner the average rate for the eight middle weeks will show the effect of the compensation for mean temperature; whilst the average of the last eight weeks will show the effect of the compensation for extreme heat;—eliminated as far as possible by taking the average of a tolerably long period of temperature of one kind.

Now if this rule simply increased the length of trial in each temperature, it would be a very good one for arriving at the effect of the secondary compensation. On examination, however, it will be found to do a great deal more.

Let us try it by example on the chronometer rates of last year; for which purpose I extract the following temperatures in each of the twenty-five weeks, during the trial of chronometers at the Royal Observatory in 1852, from the Government list, at pages 4 and 5, and arrange them in the divisions proposed by Mr. Denison.

| Temperatures in the first 8 weeks. | Temperatures in the second 8 weeks. | Temperatures in the third division of 9 weeks. |
|---|---|---|
| 21° | 46° | 54° |
| 49 | 56 | 60 |
| 30 | 42 | 57 |
| 46 | 52 | 66 |
| 28 | 47 | 60 |
| 49 | 56 | 69 |
| 30 | 45 | 61 |
| 48 | 60 | 68 |
| 32 | 49 | 80 |
| 52 | 61 | 106 |
| 34 | 52 | 80 |
| 52 | 61 | 115 |
| 35 | 56 | 82 |
| 56 | 63 | 109 |
| 47 | 56 | 76 |
| 60 | 63 | 106 |
| —— | —— | 84 |
| 16)669(42 | 16)865(54 | 106 |
| 64 | 80 | —— |
| —— | —— | 18)1439(80 |
| 29 | 65 | 1440 |
| 32 | 64 | —— |

On looking over this example we find the following:

1. That the column which should represent the extreme cold varies in temperature from 21° to 60°; that the second column varies from 42° to 63°; whilst the third column varies from 54° to 115°. None of the three periods, therefore, consist exclusively either of extreme cold, middle temperature, or of extreme heat; but each period contains a variety of temperatures intermingled together. Now the chronometer might gain in one temperature and lose in another; but if the two were mixed together, it would make it appear that it had neither gained nor lost, and it would consequently not be possible to ascertain the error in the individual temperatures unless they were kept distinct from each other.

2. That if each column of temperatures be added together, and divided for the mean, we find the extremes are not 21° and 115°, as set down in Mr. Denison's Table printed in No. 27 of the Journal, but 42° and 80°; in fact, little more than middle temperatures compared with the others.

3. That we have only three temperatures to judge of, when in reality the secondary compensation is not merely required for three points on the thermometer, but for every temperature throughout the range; and to show the fallacy of the rule in this particular, I need only observe that had it been carried a step further, and the three temperatures reduced to one, it would have proved that no compensation was necessary for change of temperature at all.

4. That even the three divisions into which the rule reduces the temperatures, are not extreme cold, middle temperature, and extreme heat, but 42°, 54°, and 80°,—temperatures at which the effect of the secondary compensation would scarcely be appreciable; for I need not remind practical men that when the ordinary balance, unassisted by supplemental compensation, is adjusted at 42° and 80°, the error at 54°, from its being only 12° above the lower temperature, will be very small.

However favourable, therefore, this method of analysing the rates may be to the kind of supplemental compensation which can only be adjusted for certain temperatures at the expense of producing sudden irregularity in others, it is unfitted for arriving at the chronometer's performance in every gradation of temperature; and therefore useless for determining the relative merits of the different modes of secondary compensation.

Yet it is upon this foundation that Mr. Denison has ventured to pronounce the Observatory rule all wrong for this purpose, and that my chronometers, instead of being first four years out of five, have been beaten every year. Now had the Observatory rule not been correct, it is the rule by which the competitors knew the merits of their chronometers would be determined; and therefore it would be unfair for any one to come forward after the trials were over, and say, It is true your chronometers have beaten the others according to the original conditions, but here is a rule that will reverse the order of things; and to adopt this course on such a rule as that employed by Mr. Denison will probably appear strange to the Members of the Society of Arts.

Having noticed Mr. Denison's rule, I will now describe the method by which the merits of the chronometers have been determined at the Observatory for many years past. This method consists in ascertaining from the weekly sums of daily rates in the order of time—not in the order of temperature, as Mr. Denison has it—first, the difference between the greatest and least weekly rate during the whole trial; and secondly, the greatest difference between one week's rate and the next. These errors are given in two columns on the last page of the rates; and the chronometers are arranged in the order of merit by multiplying the number of seconds in the column headed "greatest difference between one week and the next" by 2, and adding the product to the seconds contained in the other column, which gives the trial number. It was by this rule that the Table given in the abstract of my paper (*vide* No. 27 of the Journal) and the one now added were arranged.

### ERRORS OF DENT'S CHRONOMETERS IN THE OBSERVATORY TRIALS FROM 1848 TO 1852.

| Year. | No. of Chron. | Position in order of Merit. | Difference between the greatest and least. | Greatest diff. between one week and the next. | Trial No. |
|---|---|---|---|---|---|
| | | | s. | s. | |
| 1848 | 2035 | 8th | 21·4 | 6·1 | 33·6 |
| | 2100 | 22nd | 29·7 | 8·0 | 45·7 |
| 1849 | 2100 | 13th | 33·2 | 20·1 | 73·4 |
| 1850 | 2173 | 3rd | 13·2 | 9·2 | 31·7 |
| 1851 | 2255 | 9th | 26·7 | 17·9 | 62·5 |
| 1852 | 2240 | 3rd | 15·9 | 12·0 | 39·9 |
| | | | 6) 140·1 | 6) 73·3 | 6) 286·8 |
| Average of the whole ... | | | 23·3 | 12·2 | 47·8 |

### ERRORS OF LOSEBY'S CHRONOMETERS IN THE SAME TRIALS.

| Year. | No. of Chron. | Position in order of Merit. | Difference between the greatest and least. | Greatest diff. between one week and the next. | Trial No. |
|---|---|---|---|---|---|
| | | | s. | s. | |
| 1848 | 115 | 1st | 8·7 | 4·6 | 17·9 |
| | 118 | 3rd | 13·3 | 6·6 | 26·5 |
| 1849 | 124 | 3rd | 17·3 | 9·2 | 35·7 |
| 1850 | 123 | 1st | 12·7 | 4·7 | 22·1 |
| 1851 | 127 | 1st | 16·5 | 4·4 | 25·3 |
| 1852 | 125 | 1st | 11·7 | 9·4 | 30·5 |
| | | | 6) 80·2 | 6) 38·9 | 6) 158·0 |
| Average of the whole ... | | | 13·3 | 6·5 | 26·3 |

From this Table it will be seen that in the average of five years, the error of Mr. Dent's chronometers is nearly double the error of mine; that in the most favourable instance it is one-third more; whilst in one trial, that of 1851, the error is nearly three times greater.

Now, had one construction of vessel beaten another five years in succession in the average proportion of one half the entire distance sailed over, there would not have remained much doubt of the great superiority of one construction over the other.

Mr. Denison affirms, that this excellence has simply been owing to the care I have personally bestowed on the chronometers, and not to an improvement in the compensation. Now it is true that I have attended personally to the adjustment of my chronometers all along; but this is no more than what every competent person probably attends to in the chronometers sent for trial to the Observatory. To suppose, therefore, that one maker should be able to produce chronometers which should singly beat from twenty to fifty others four years out of five, simply by the care he bestowed, would be to impute a degree of carelessness to the other makers, which Mr. Denison, if he were a practical man, and had to contend with them, would find there was very little ground for; yet he goes on to support this position by bringing forward the performance of a chronometer of the ordinary construction adjusted by Mr. Dent, and tried in 1829.

Now, I have a better knowledge of what chronometers do at the present day than of what they did three-and-twenty years ago, and will therefore compare the rate given of this chronometer with the rate of Mr. Dent's patent construction in the trials at the Observatory during the last five years. Referring then to the Table already given, we find the average error of his patent chronometer to be 12·2 seconds between one week and the next; and supposing the statement concerning the other chronometer only varying 0·54 seconds in twelve months to be correct, it would appear that the patent construction, aided by twenty years' additional experience, varies twenty-two times more in a week than the ordinary construction did in a year.

If the instance adduced by Mr. Denison does not therefore prove what he intended it should, it at least shows something else.

Hitherto I have spoken only of the ordinary chronometer trials; but there have been other trials of my improvement, conducted by the Astronomer Royal, at the request of the Board of Admiralty, of a more important character as regards the secondary compensation. These were special trials instituted in 1845, and 1846, particularly to test the principle; and in order that the trials should be more severe than any to which chronometers had before been exposed at the Observatory, I voluntarily proposed that the chronometers should be immersed in freezing mixtures, in order to test the principle in much lower temperatures than occur naturally in this climate. Before this proposition could be carried out, one or two difficulties had to be overcome: in the first place, the Observatory was not furnished with the necessary apparatus; and in the second, the Astronomer Royal was unwilling to incur the risk of damage that might occur to the chronometers from the employment of freezing mixtures. Not wishing, however, to give up the most severe part of the trial, I forwarded suitable apparatus to the Observatory, and undertook the risk of injury to my chronometers from its use; and also to repair such damage as might occur to any other chronometers that should be submitted to the same test for the purpose of comparison. I also sent an apparatus for exposing the chronometers to artificial heat, in which high temperatures could be more steadily maintained than in the iron tray then employed at the Observatory.

The results of these trials were given by the Astronomer Royal, in two Reports to the Board of Admiralty; and as they may be found in a Parliamentary return, obtained by Sir George Pechell, in 1849, I need only insert the following extract from the first Report, with the *mean* of the temperatures to which the chronometers were exposed, from the second Report:

"Mr. Loseby attaches to the balances of his chronometers curved tubes containing mercury.

"It is evident that the mercury, in expanding with an increasing temperature, arrives in parts of the tubes inclined in different degrees to the radii of the balance, and therefore its successive expansions produce successive effects of different magnitude on the momentum of the inertia of the balance. And by giving different forms to the tubes containing the mercury, the law of the successive alterations of the momentum of inertia may be made to adapt itself to the law of alteration of the elasticity of the spring, whatever that law may be.

"I consider this contrivance (taking advantage very happily of the two distinguishing properties of mercury, its fluidity, and its great thermal expansion,) as the most ingenious that I have seen, and the most perfectly adaptable to the wants of chronometers. I am not aware that it is liable to any special inconvenience."

Mean of the temperatures employed in the special trials of Loseby's secondary compensation at the Royal Observatory:

Fah.

| | | | | | |
|---|---|---|---|---|---|
| 13° | 19° | 52° | 63° | 79° | 97° |
| 14 | 38 | 54 | 71 | 86 | 106 |
| 18, | 49 | 59 | 78 | 97 | 112 |

I have before observed that these trials, from their being instituted with the direct object of testing the principle, were of the greatest importance as regarded the secondary compensation; yet Mr. Denison omitted to notice them altogether: an omission not the less unjust from the fact of their being the only trials of a similar character which have taken place at the Observatory, much less that any other kind of secondary compensation has succeeded in them.

I may observe in conclusion, that Mr. Denison told us, the other evening, my method of secondary compensation was not the best, and referred us to his Exhibition Report; but on looking there I find he states that it is the best. If therefore he were recognised as any authority on horology, I might ask which opinion it was that he wished the public to believe?

Yours, &c.,

E. T. Loseby.

## GLASS BALANCE SPRINGS.

Effra Vale Lodge, Brixton, June 2nd, 1853.

Sir,—I beg leave to make a few remarks with reference to my paper, "On the Construction and Application of Glass Balance Springs," read before the Society of Arts on Monday, the 30th of May last. In the discussion of this paper, and at the first onset, and before a single observation had been made relating to any properties existing in glass, which would render it unsuitable for balance-springs, it was peremptorily denounced as *one of the puffs of the trade*. As this remark cannot possibly apply to the Society of Arts, I must refute it on my own behalf. The subject of my communication was not got up for the occasion, but was the mere sum of recorded experiments and observations, made by myself upwards of four years back, for my own private satisfaction only, and which would in all probability never have passed the precincts of my workroom, if I had not lately seen the notice of the Society of Arts, inviting communications on the subject, and up to the time my paper was read, I had not the slightest personal acquaintance with any chronometer maker.

As regards the objections, one of the first was, that glass was liable to effloresce, or to decompose by the action of the atmosphere, but this was too well refuted at the time to need any further notice. The rest related principally to the practical difficulties of applying so brittle a material as glass. Of this perhaps no one can be more fully aware than myself, and the plans I have proposed may to some extent remove them, and I think that when a glass-spring is securely fixed, and proved at a strain three or four times greater than it will ever endure when in action, its position is such that it will be found almost impossible to fracture it, by any external violence short of that which would destroy the timepiece. These points could be decided almost by a single trial.

With reference to any property existing in the nature of the material itself, which would disqualify it for a balance-spring, scarcely anything was said. One of the objections was that the elasticity of glass increased with increase of temperature. If this is the case, it is a property that I have not yet discovered. How exceedingly valuable such would be, in a material or metal formed into a spring, as it would contain in itself the chief element required for perfect self-compensation!

But in assuming the value of glass as a balance-spring, I will throw compensation altogether out of the question, as it may give rise to quibbles on a subject upon which no two will perhaps exactly agree, and merely consider it as applied to a common pocket watch.

Suppose we place a number of springs of various materials together under the same conditions of force, and expose them all at once to an equal temperature; would not any watchmaker of sense select that which was least affected by heat both in elasticity and length? —in these properties glass stands first in the scale. Have not watchmakers applied balance-springs of steel, either quite hard, or tempered to a straw-colour, only because it approximates more nearly towards the properties of glass? It certainly possesses a large share of the brittleness of the latter, with but a small portion of its advantages. Its expansion by heat is scarcely lessened, and it is still capable of being permanently deflected at a low temperature. I have known steel balance-springs hardened and tempered to a straw-colour, fracture spontaneously after a few years' use. On examining the broken ends with a microscope, it was evident that a molecular change had taken place in the substance of the steel. Can this ever happen with glass?—I should say decidedly not.

We may wind up a torsion balance upwards of a score of turns, and the index will return to exactly its first position, in spite of every change of temperature short of 212°. This would not be the case with steel, and I think that no one would be so absurd, as to propose the substitution of a steel wire in place of the glass thread by which the index of the balance is suspended. It was stated that glass had been tried as a chronometer-spring by several, and found not to answer. If the same kind of compensation has been applied to it as that required for steel, I should expect a failure to be the result.

If a maker puts in hand say ten chronometers of the same size, and strength of maintaining power, and as nearly alike as human skill can make them, after the first correction, perhaps only one of these will come up to the desired standard, others will be more or less troublesome, and three or four out of the number will baffle all attempts to set them right for weeks and months. Such being the case, is one or even ten different trials, of a strange material, sufficient to prove its failure? My own belief is, that glass balance-springs have never had a sufficient trial, even in the hands of Mr. Dent himself.

I have not yet heard one single sound objection raised against the advantages that theory has shown glass to possess, sufficient to deter me from further experiments, and in conclusion I must state, that I do not make these remarks for the sake of exciting a controversy, for if any one will come forward and prove that there is any theoretical defect in this material, which will render it rotten in its very foundation when applied as a balance-spring, I shall be the first to verify it, and so far as I am concerned, end all further dispute on the subject. A subject like this ought to be discussed, without the influence of petty trade feelings of prejudice or self-interest. It is simply a scientific question, that the Society of Arts have brought before the world, and as regards anything that watch and chronometer makers have said concerning it, it still remains unanswered.

I remain, Sir,
Your obedient Servant,
F. H. Wenham.

## PROCEEDINGS OF INSTITUTIONS.

Bristol.—The Eighth Annual Report of the Directors of the Athenæum, which was presented at the Annual General Meeting, held on the 27th of April last, states, that the number of subscribers and amount of subscriptions are not so large as in the two previous years, which is attributed to the omission of lectures, owing to the present apartments not affording sufficient accommodation for that purpose. The number of subscribers for the past year was 836, and amount of subscriptions, 459*l.* 1*s.* 6*d.*, as compared with 967, paying 547*l.* 11*s.* 0*d.*, in the previous year. The Directors express the hope, that when the new premises in Corn-street are occupied, the prosperity of the Athenæum will be considerably increased.

GLASGOW.—The Thirtieth Annual Report of the Mechanics' Institution states, that there has been a falling-off in the attendance on some of the most popular classes, due, the Committee of Management believe, to a disposition on the part of the public generally, to give the preference to Lectures and Exhibitions which contribute to their general amusement over those more solid and practically useful studies which it is the province of the Mechanics' Institution to elucidate and teach. The following is an analysis of the attendance at the classes, with the names of the Lecturers:

| | | |
|---|---|---|
| Chemistry . . . . . . | Dr. PENNY . . . | 140 |
| Natural Philosophy . . . | PROFESSOR SCOTT | 96 |
| Anatomy and Physiology . | Dr. ALEX. LINDSAY | 31 |
| Mathematics . . . . . | PROFESSOR SCOTT | 65 |
| Mechanical Drawing . . | Mr. ROBT. HARVEY | 81 |
| Botany . . . . . . . | Mr. R. KENNEDY | 50 |

Acting on a suggestion of the Society of Arts, that a systematic interchange among Mechanics' Institutes, of specimens illustrating the manufactures of each particular district, would materially enhance the value of such Institutions, the Committee has resolved to form a collection of the productions of this neighbourhood, exhibiting the raw material and the various stages of manufacture, and also to exchange specimens of these for those of other districts; and for this purpose, have issued circulars to the proprietors of several of the most eminent manufactories in the vicinity, requesting their aid in furnishing such specimens. The library has received considerable additions; and during the last six months 4,938 volumes have been issued, being about eighteen volumes to each reader. The following analysis shows the occupations of the students reading in the Library: architects and civil engineers, 12; baker, 1; bookbinder, 1; cabinetmakers, 4; calico-printer, 1; chemists, 12; clerks, 61; clothlappers, 5; confectioner, 1; cooper, 1; cotton spinner, 1; designers, 9; dyers, 4; editor, 1; jewellers, 3; joiner, 1; letter-press printers, 3; manufacturers, 3; masons, 2; masters and managers, 11; merchants, 7; mechanics, mill-wrights and engineers, 33; optician, 1; painters, 2; plumbers, 3; reedmaker, 1; shoemaker, 1; smiths, 5; slaters, 2; starch manufacturer, 1; students, 8; sugar refiners, 2; tailors, 2; teachers, 3; upholsterers, 2; warehousemen, 49; no profession given, 18.

HACKNEY.—The Literary and Scientific Institution has just completed its Spring Course of Lectures, which embraced two by Mr. George Grosmith: one on "English Notions of American Character," the other on the "Ludicrous in Life;" one by Mr. F. Chatterton, on "The Harp;" two by Mr. George Thompson, on "British India;" one by Mr. Thomas Price, on "Alfred the Great;" one by Mr. C. F. Partington, on the "Eye and Ear;" two by Dr. Bachhoffner, on the "Atmosphere," and on "Voltaic Electricity;" two by Mr. George Dawson, on "Old Books;" two by Mrs. Balfour, on "Home Influence," and on the "Life of Cowper;" with musical entertainments, by the Messrs. Distin, Mr. Henry Phillips, and others. The payments to the lectur amounted to 95*l.* 0*s.* 6*d.*; the receipts from non-member to 66*l.* 2*s.*; making the actual cost less than 30*l.* to th Institution, which numbers 588 members, besides 2 lady admissions to the lectures. This Institution is in very satisfactory condition,—in a great degree owing t the advantage it enjoys, of having (through the liberali of J. R. D. Tyssen, Esq.) the use of a large and m convenient suite of rooms rent-free, so that it is enabl to offer all the attractions of the highest-class institutio for an annual subscription of 10*s.*

LEISTON.—A Lecture on "Popular Superstitions was delivered to the Members of the Mechanics' Ins tution, on Monday evening, June 6th, by Mr. Simps of London, who was listened to with marked attenti throughout. The manner in which the subject w treated gave great satisfaction, and the illustrations the various kinds of "popular superstitions," were mu approved. This Institution is now in the third year of existence, and has progressed most favourably. It num bers 120 members, with a library of about 900 volum The members are composed principally of engineers a mechanics in the employment of Messrs. Richard Ga rett and Sons, of Saxmundham, the senior partner that firm being the President.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain ori nal information or suggestions on the subjects included the Society's Premium-list, or other topics connected wi the Society's various departments of operation, are invite to communicate the same to the Secretary, in as condens a form as possible, for the purpose of being either read a discussed at the evening meetings, or inserted in th Society's weekly Journal. Anonymous letters cannot attended to. All communications, whether the autho name is to appear or not, must be accompanied by th writer's name and address.

Members of the Society who do not receive the Journa regularly, are requested to give immediate notice to th Secretary; and, in order to prevent mistakes, they particularly requested to signify any change which th desire to have made in their address, with as little delay possible.

*Country Institutions.*—Correspondents who are so good as send reports of proceedings of Local Institutions, are quested to forward them immediately after the Meeting which they refer, and not later than Tuesday morning, intended for insertion in the following Friday's Journal.

*Errata.*—In page 329, line 7, *for* "from 2½*d.* to 1½*d.* per yard *read*, "from 2*d.* to 1*d.* per yard."

## MISCELLANEA.

METHOD OF TREATING FATTY OR OLEAGINO BODIES.—Mr. S. G. Archibald, has lately taken out patent for "An improved mode of Extracting or Re dering Animal Fats and Oils." The invention is for th purpose of separating the fibrine or other extraneo matters therefrom, and obtaining a sound bright oil tallow, according to the material operated upon. carrying out this invention, the patentee provides one more steam-tight tanks, and connects the same to a ordinary steam-boiler, which is provided for the purpo of supplying them with steam at a high pressure. Into such a tank the material to be operated upon is placed; and, after being subjected to steam-heat for the requisite period, the fat or oil is drawn off, and the refuse matters are discharged from the tank, through a suitable opening provided for the purpose. When seal oil is required to be extracted or rendered, the fat is separated from the pelt of the seal in the ordinary manner, and placed in the tank through a man-hole, and the lid thereof is secured steam-tight. It is preferred to operate upon the animal matter while fresh, or before decomposition has commenced, or proceeded far; for, otherwise, the application of the steam-heat will bring out a colouring property, which exposure to the air has imparted to the fat; and thus a dark-coloured, instead of a bright pale oil, will be the result. When whale oil is to be rendered, the blubber is cut into small pieces, and placed in the tank. Steam is then admitted to the tank, and the pressure brought up to from 50 to 60 lbs. to the square inch. The heat to which this pressure is equivalent, will immediately act upon the cellular tissue or membrane of the material under operation,—causing the cells to burst, and the oil or fat to flow readily. The tissue, as well as all the animal fibre, will become dissolved; and, upon ebullition ceasing, the glutinous mass will, together with the condensed water, fall to the bottom of the tank.

MARYLEBONE FREE LIBRARY.—A public meeting of the inhabitants of the borough of Marylebone was held at Blagrove's Concert Rooms, Mortimer-street, Cavendish-square, on Monday week, for the purpose of promoting the establishment of a Free Library for the district. The chair was taken by Mr. Joseph Hume, M.P., who, in his opening speech, dwelt upon the advantages of a system of national education purely secular, and recommended free libraries as an agent for effecting it. His Excellency Mr Ingersoll, the American Minister, moved the first resolution, to the effect that the establishment of free libraries is eminently calculated to elevate the social condition of the people; and in doing so recounted the great progress made by America in consequence of the general diffusion of education, wondering that the establishment of free libraries should have been so long delayed in this country, when he found Gibbon, at the period that he was writing his great work, complaining of their non-existence. Sir Benjamin Hall, M.P., seconded the motion, and complained of the money already subscribed (1,000*l.*) as insignificant when compared with the district. Mr. Ewart, M.P., supported the motion, and explained how his bill might be modified so as to enable parishes, as well as towns having municipal corporations, to erect free libraries, and to rate themselves for their support. The motion was then agreed to. Mr. Macgregor, M.P., moved a resolution pledging the meeting to establish such an institution in Marylebone. This having been seconded by Mr. Gregson, M.P., was unanimously agreed to. Mr. Benjamin Oliveira, M.P., and other gentlemen having addressed the meeting, the proceedings terminated with the usual vote of thanks to the chairman.

## PARLIAMENTARY REPORTS.

Par. No. *Delivered on 2nd June*, 1853.

534. Bills—Excise Duties on Spirits (amended.)
542. „ —Income Tax (amended).
543. „ —Whittlebury Forest (as amended by the Select Committee).
Cape of Good Hope (Representative Assembly)—Further Papers.
Cape of Good Hope (Kafir Tribes)—Correspondence.
Census of Great Britain, 1851—Population Tables, Vol. II.

*Delivered on 3rd June.*

431. Election Petitions—Return.
505. East India—Accounts.
515. Queen's Colleges (Ireland)—Returns.
516. Glasgow Waterworks' Bill—Report of the Inspectors.
522. Foreign Sugar—Account.
547. Spirits (Ireland)—Return of number of gallons distilled, &c.
548. Spirits (Ireland)—Return.
518. Bills—Thames Embankment.
519. „ —Pimlico Improvement.
551. „ —Glanders Prevention (Ireland).
Census of Great Britain, 1851—Population Tables, Index.

*Delivered on 4th and 6th June.*

509. Berwick-upon-Tweed Election—Minutes of Evidence.
507. Pilotage—Return.
111. Poor-law—Return.
489. Cinque Ports' Pilots—Accounts.
492. Public Income and Expenditure—Return.
524. Bank of England—Accounts.
525. Strangers and Divisions—Report from Committee.
538. Highways (Melton Mowbray)—Account.
563. Committee of Selection—Thirteenth Report.
562. Bill—Belfast Municipal Boundaries.
Prisons (Ireland)—Report of the Inspector.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette*, 3rd *June*, 1853.

*Dated 27th April*, 1853.

1011. J. Dinning—Wash-stands and baths.

*Dated 2nd May.*

1056. J. Greenwood—Fixing mordants.

*Dated 4th May.*

1086. C. A. Jaquin—Covered buttons, by dies and pressure.

*Dated 6th May.*

1121. C. Nickels—Machinery for masticating, &c., India-rubber, &c.
1122. W. and J. Longmaid—Treatment of waste products in smelting.

*Dated 13th May.*

1188. J. Knowles and E. T. Bellhouse—Manufacture of articles in marble.

*Dated 18th May.*

1221. C. R. N. Palmer—Improved mode for working machinery in factories and ships.
1223. B. P. Walker and J. Warren—Manufacture of iron.
1225. C. Clarkson—Dusting, painting, and other brushes.
1227. J. Ryan—Purifying liquids.
1229. J. Barsham—Charring peat and burning lime.
1231. G. Sant—Clocks.
1233. J. Oakey—Reducing emery, &c.
1235. J. Allen—Communicating intelligence.

*Dated 19th May.*

1237. S. Wright—Safety-tap.
1238. T. Grahame—Covering materials for houses, &c.
1239. W. E. Newton—Machinery for pumping and supplying steam-boilers. (A communication.)
1240. J. Kippesley—Steam-engines for agricultural purposes, and for locomotion on common roads.
1241. J. A. Gilbert—Canisters.
1242. J. Wainwright—Steam-engine governor.
1243. J. T. Manifold, C. Lowndes, and J. Jordan—Extracting juice from sugar-cane.
1244. W. Fulton—Treatment and scouring textile fabrics.
1245. C. de Bergne—Permanent way, chairs, and sleepers.

*Dated 20th May.*

1246. S. T. Baker—Revolving shutters.
1247. C. Cowper—Steam-boilers.
1248. E. J. Schollick—Motive-power.
1249. S. Schollick—Ship-building.
1250. H. Gilbert—Apparatus for cleaning boots and shoes.
1251. A. E. L. Bellford—Rotatory engines and steam-boilers. (A communication.)
1252. T. J. Dimsdale—Purifying coal-gas, and disinfecting sewage matters.
1253. E. H. Bentall—Measuring power of engines, &c.
1254. W. C. Thornton—Machinery for wire-cards.

*Dated 21st May.*

1255. G. Carter—Fire-lighters, and machinery for same.
1256. J. Blair—Steam-power for railway breaks.
1257. J. Betteley—Anchors.
1259. L. G. D. B. D. Ducayla—Artificial fuel. (A communication.)
1261. G. Marriott—Fire-lighters.
1202. A. E. L. Bellford—Navigable vessels. (A communication.)

*Dated 23rd May.*

1263. S. A. Carpenter—Elastic webbing.
1264. E. Evans—Castors for furniture.
1265. A. A. Girouard—Paving with asphalte, &c.
1266. W. Simson—Locks.
1267. A. E. L. Bellford—Treatment of flax and hemp, so as to be spun by cotton and wool-machinery. (A communication.)
1268. A. Devy—Storing and preserving grain. (A communication.)
1269. J. H. Browne—Apparatus for bottling.
1270. P. Hannuic and G. Collasson—Treatment of oil.
1271. H. Turner—Hydraulic power to windlasses.
1272. J. H. Johnson—Forge-hammers. (A communication.)
1273. J. H. Johnson—Pipe and other junctions. (A communication.)
1274. W. J. Sluce, G. B. Mather, and P. Wood—Raising and forcing water, &c.

*Dated 25th May.*

1276. W. Babb—Hats, caps, and bonnets.

1278. G. I. Higginson—Evaporating.

1280. J. Lovell—Heating and ventilating.

1282. P. A. Deverte and C. Eck—Combing wool.

1284. P. T. Bunderovet—Shutters.

1286. J. D. and J. Carr—Oven.

APPLICATION WITH COMPLETE SPECIFICATION FILED.

1287. W. H. Mitchell — Distributing and composing types. 25th May, 1853.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 2nd June*, 1853.

Year, 1852:

945. Cornelius De Bergne, of Manchester—Improvements in and applicable to looms for weaving. (A communication.)

*Sealed 3rd June*, 1853.

Year, 1852:

940. Noble Seward, of Cahercoulish, Limerick — Improvements in applying hydro-pneumatic agency for obtaining motive-power.

900. Joseph Bentley, of Liverpool—Improvements applicable to fire-arms.

1008. William Baddeley, of 13, Angel-terrace, St. Peter's, Islington—Improvements in the manufacture of metal pipes. (A communication.)

1052. William Irlam, of Manchester—Improvements in railways.

1065. John Mason, of Rochdale—Improvements in the processes of bleaching and dyeing textile materials and fabrics.

1145. William Westley and Richard Bayliss, of Derby—Invention of an improved fastener, applicable to the fastening of window-sashes, tables, and other similar purposes.

1154. John Lowther Murphy, of Birmingham—Improvements in drawing off liquids from barrels and other vessels.

Year, 1853:

612. Hon. W. E. Cochrane, of Albany-street, Regent's-park—Improvements in girths or pads for retaining saddles in their places.

689. Thomas Sykes, of Castleford, Yorkshire—Improvements in the treating of soapy and greasy water. (A communication.)

886. Nathaniel Clayton and Joseph Shuttleworth, of Stamp End Iron-works, Lincoln—Improvements in portable and locomotive-steam engines.

*Sealed 4th June*, 1853.

Year, 1852:

964. Isaac Lewis Pulvermacher, of Paris—Improvements in pipes and cigar-holders.

Year, 1853:

610. Thomas Butler Johnson, of Upper Clapton—Improvements in roads or ways, pavements, and footpaths generally.

859. William Penn Cresson, of George-street, Portman-square—Improvements in lathes and parts connected therewith, for the purpose of reducing and smoothing the surfaces of certain metal wares. (A communication.)

*Sealed 6th June*, 1853.

Year, 1852:

969. Andre Jacques Amand Gautier, of Paris—Invention of an improved treatment of peat.

972. Charles Alfred Jordery, of 12, Rue Thèvenot, Paris—Improvements in the construction of the bodies of cravat collars, stocks, and stiffeners, and in the ornamenting of cravat collars and stocks in general.

976. John Norman, of Liverpool—Improvements in the mode of making and setting the square-sails of ships or vessels of any size or description.

980. Thomas Conolly, M.P., of Hanover-square, and William Cotter, of Beeston, Nottingham — Improvements in propelling vessels.

*Sealed 7th June*, 1853.

Year, 1852:

990. Richard Archibald Brooman, of 166, Fleet-street—Improvements in machinery or apparatus for heating or evaporating, torrifying, distilling, and refrigerating. (A communication.)

1004. Joseph Hopkins, of Worcester—Improvements in obtaining a straight line parallel to the axis of the earth, or in rendering the axis of a tube or of a telescope parallel thereto.

1060. William Edward Middleton, of Birmingham—Invention of a new or improved lubricator. (A communication.)

1062. Susan Walker, of Horsham—Improvements in clogs or pattens.

1078. James Stevens, of Birmingham—Improvements in grinding and polishing lenses.

1118. Ferdinand D'Albert, of 4, South-street, Finsbury—Invention of a certain chemical combination for replacing indigo, which I call "D'Albert Blue."

1127. John Roydes, of Greengate, near Rochdale—Improvements in machinery or apparatus for drawing cotton and other fibrous substances.

1031. John Roberts, of Upnor, Frindsbury, Kent—Improvements in apparatus for preserving animal and vegetable matters, and for cooling wines and other liquids.

1159. Robert Griffiths, of 25, Great Ormond-street—Improvements in giving motion to drills.

1172. John Mason, of Rochdale—Improvements in machinery or apparatus for preparing cotton and other fibrous substances for spinning.

Year, 1853.

57. William Henderson, of Bow-common—Improvements in manufacturing sulphuric acid and copper from copper ores, reguluses, and matts.

71. Henry Constantine Jennings, of Great Tower-street—Improvements in separating the more fluid parts of fatty and oily matters.

352. Charles Cuylits, of Antwerp—Improvements in apparatus for regulating or governing the speed of steam or other engines. (A communication.)

381. Peter Armand Le Comte de Foutaine Moreau, of 4, South-street, Finsbury—Improvements in treating fibrous substances. (A communication.)

540. William Edward Newton, of 66, Chancery-lane — Improvements in primers for fire-arms. (A communication.)

629. Thomas Rhodes, of Regent Works, Leeds—Improvements in the manufacture of manure.

629. James Murdoch, of 7, Staple's-inn—Invention of an improved construction of portable voltaic batteries. (A communication.)

718. William Keates, of the firm of Messrs. Newton, Keates, and Co., Liverpool—Improvements in the manufacture of tubes and mandrils (Partly a communication.)

747. Henry Lee Corlett, of 106, Summer Hill, Dublin—Improvements in railway wagons.

793. William Edward Newton, of 66, Chancery-lane — Improvements in engines to be worked by air or gases. (A communication.)

838. Colin Mather—Improvements in power-looms.

887. George Elliott and William Russell, of St. Helen's, Lancashire—Improvements in the manufacture of alkali.

891. Douglas Hebson, of 1, Dale-street, Liverpool—Improvements in working the air-pumps of steam-engines.

896. John Hinks and George Wells, of Birmingham—Improvements in certain kinds of boxes.

897. Thomas Lovell Preston, of Birmingham—Improvements in cutting out and piercing metals.

900. Charles Lowe, of Sheepy Hall, in Sheepy Magna, Leicester—Improvements in mills for grinding wheat and other grain.

908. Charles Green and James Newman, of Birmingham—Improvements in the manufacture of wheels.

909. Robert Wyburn, of East-street, Taunton—Improvements in the construction of easy chairs.

911. William John Thomas Jones, of 10, Palace-street, Pimlico—Improvements in steam-engine governors.

912. David Zenner, of Newcastle-upon-Tyne—Improvements in the treatment of ores and other substances containing metals, to obtain products therefrom, and the apparatus used therein.

913. Alexander Crighton, of 4, St. George's-terrace, Park-road, Liverpool—Improvements in the fitting of bilge-pumps, and injection-cocks of iron steamers and sailing vessels.

917. William Wilkinson, of Nottingham—Improvements in ropes, cords, lines, twines, and small bandings.

942. John Chatterton, of Birmingham — Improvements in coating tubes.

944. John Fuller, of Thomas-place, Thomas-street, Kennington—Improvements in galvanic batteries.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| June 3 | 3471 | Improved Pen-holder. | Joseph Gillott | Victoria Works, Birmingham. |
| „ 4 | 3472 | Improved Hawse-plug. | C. A. and T. Ferguson | Mast-House, Millwall, Poplar. |

# SOCIETY OF ARTS.

**FRIDAY, JUNE 17th, 1853.**

## DISTRIBUTION OF MEDALS AND PREMIUMS.

*Friday, June 10th*, 1853.

The Distribution of Prizes, adjudged by the Society during the past Session, took place on Friday, the 10th inst.; His Royal Highness Prince Albert, K.G., President, in the Chair.

His Royal Highness Prince Albert having taken the Chair, rose and said: Ladies and Gentlemen,—Three years have elapsed since this Society last distributed its Medals and Honorary Awards for Inventions. The interruption which has taken place is owing to the Great Exhibition of 1851, the excitement which it produced, and the large share of public attention which it claimed. This Society has taken such an honourable part in that great event that it need not be ashamed to refer to it. I hope that you will be convinced, from the works and inventions which will be brought before you to-day, that the inventive genius and skill of this country is still making most rapid strides. I shall now call upon the Secretary to read the Report.

The Secretary then read the following Report:

Since the last General Meeting of the Society for the Distribution of Premiums, three years have elapsed, and this period has certainly not been the least eventful portion of the history of the Society, whether the subjects which have occupied the attention of the whole body, or the exertions of its individual members, are considered. If there were no other circumstances to chronicle than those which relate to the part taken by the Society, in connection with the Great Exhibition, there would be much connected with the industrial progress of the world to record; and everything belonging to the history of that great event has a new and ever-growing importance, when taken in connection with the rapidly-developing spirit of international co-operation, of which it was, in truth, the first illustration. The share which this Society had in promoting the Great Exhibition, will be recorded in the history of our country; it is known to all, and, in truth, it would hardly be necessary now to refer to it, were it not that several of the Prizes about to be awarded relate directly to that event; and, further, that the varied and important services connected with it, which for nearly ten years have occupied many of our most active members, have to a considerable extent interfered with and modified the Prize Lists of the last three years. In the year 1851 the ordinary Prize List of the Society was altogether suspended, and in place of it special Premiums, connected wholly with the Exhibition, were offered. It must not be supposed, however, that in consequence of the time and attention thus devoted to these particular subjects, that the other branches of the Society's operations have been abandoned or neglected; on the contrary, it is probable than in no three years of the last century has the Society done more to advance the true interests of the Arts, Manufactures, and Commerce of the country, than in the three last Sessions. This is not the time to enumerate the good works which the Society has undertaken or carried out; yet it is right that I should remind you of them, and that I should observe, that if a smaller number of Prizes are now given than used to be the case, it is not because the Society is less able or less willing than it was formerly to reward merit, but because, from the altered spirit of the times, the encouragement and aid of the Society is less needed as a means of bringing forth isolated inventions and dormant talents, and is more urgently needed in the development of enlarged generalizations and comprehensive measures.

The Secretary then proceeded to read the List of Awards, briefly describing the subjects for which the several Premiums were given.

1. To Mr. Joshua Rogers, of 133, Bunhill-row, for his Shilling Box of Water-colours—the Silver Medal.
2. To Mr. John Cronmire, 10, Cottage-lane, Commercial-road East, for his Half-crown Box of Mathematical Instruments—the Silver Medal.
3. To Mr. James Taylor, of Elgin, for his Essay on the Cotton Manufactures of India—the Isis Medal.
4. To Mr. Henry Weekes, A.R.A., for his Essay on the Fine Arts Department of the Great Exhibition—the Silver Medal.
5. To Mr. F. C. Bakewell, for his Essay on the Machinery of the Great Exhibition—the Silver Medal.
6. To Dr. Robinson, of Newcastle, for his Improved Safety-lamp for Miners—the Thanks of the Society.
7. To Mr. R. G. Salter, for his Method of Flushing Sewers—the Silver Medal.
8. To Mr. Jonas Bateman, for his Improved Life-boat—the Thanks of the Society.
9. To Mr. William Clerichew, of Ceylon, for his Improvements in the Curing of Coffee—the Isis Gold Medal.
10. To Mr. W. Vaughan, of Maidstone, for his Machine for putting together Chimney-pieces—the Silver Medal.
11. To Admiral Sir Henry Hart, of Greenwich, for his Mode of curing Smoky Chimneys—the Isis Medal.
12. To Mr. J. Rock, jun., of Hastings, for his new Carriage-spring—the Isis Medal.
13. To Dr. Stolle, of Berlin, for his Essay on the Manufacture of Sugar—the Thanks of the Society.
14. To Dr. Cumin, of Bath, for his Specimens of Paper from Sugar-cane Refuse—the Thanks of the Society.
15. To Mr. W. Bollaert, for his Essay on the Use and Preparation of Salt—the Society's Medal.
16. To Mr. H. Owen Huskisson, for his Essay on the Use and Preparation of Salt—the Society's Medal.
17. To Mr. John Dalton, of Hollingworth, for his Double register Machine for Printing calico—the Society's Medal.
18. To Mr. G. Scholes, of Landport, for his slide-motion Indicator—the Society's Medal.
19. To Mr. G. Edwards, for his Improved Portable Photographic Camera—the Society's Medal.
20. To Mr. J. Toynbee, F.R.S., for his Artificial Membrana Tympani—the Society's Medal.
21. To Mr. W. Wood, for his Improved Mode of Teaching Music to the Blind—the Society's Medal.

22. **To Mr. A. Claudet, for his Essay on the Stereoscope, and its applications to Photography—the Society's Medal.**
23. **To Mr. Joseph Hopkins, of Worcester, for his Mode of giving Equatorial Motion to Telescopes—the Society's Medal.**
24. **To Mr. G. Jennings, for his Improvements connected with the Drainage of Houses—the Society's Medal.**
25. **To Mr. H. J. Saxby, of Miletown, Sheerness, for his Lock—the Society's Medal and 10*l*.**
26. **To Mrs. A. Thomson, of New Bond-street, for Four Drawings in Outline—the Society's Medal.**
27. **To Mr. W. Stones, of Queenhithe, for his Essay on the Manufacture of Paper—the Society's Medal.**
28. **To Mr. C. Shepherd, jun., of Leadenhall-street, for his Improvements in Electric Clocks—the Society's Medal.**
29. **To the Rev. W. T. Kingsley, of Cambridge, for his Discoveries in Photography—the Society's Medal.**
30. **To the Very Rev. the Dean of Hereford, for his Essay on Self-supporting Schools—the Society's Medal.**
31. **To Dr. Lloyd, of Warwick, for his Samples of Paper made from the Refuse of Cow-houses—the Thanks of the Society.**
32. **To Professor Jack, of New Brunswick, for his Essay on the Decimal System of Weights and Measures—the Thanks of the Society.**
33. **To Mr. James Hole, of Leeds, for his Essay on the History and Management of Literary, Scientific, and Mechanics' Institutions—the Society's Medal and 50*l*.**

The Marquis of Lansdowne then rose, and said: Ladies and Gentlemen,—I propose to detain you but a very few moments in asking you to concur with me in what I am about to suggest. I wish to propose to you, that you do that which I am sure will be your unanimous wish to do: that you vote your thanks to His Royal Highness for attending here this day, and for his conduct in the chair. (Applause.) In proposing this vote, I do not propose it, as I think you would not vote it, in respect only of that high situation —the highest which a subject can enjoy—in which His Royal Highness is placed in this country; but more especially you will do it on this occasion, on account of the position he occupies in your chair. (Applause.) This is not the place for me to enumerate, in His Royal Highness's presence, the many virtues which are known to adorn his character; but you will allow me to dwell for a few moments upon that particular virtue which has led him to this place, and which will long continue to have a material influence upon the prosperity and improvement of this country. (Cheers.) Not a year has elapsed since I had the honour of meeting many of the persons now present in this room. I would ask you to consider how many have been the improvements, how great has been the progress in that time—short as it appears to be in one respect, but long if you measure it by the number of improvements in arts and manufactures—improvements effected by the discovery of new principles, and the still greater application of old principles to objects of art. This has been the result, no doubt, of the general spread of enlightenment, improvement, and activity of mind, founded upon many causes, and prevailing throughout the country; but all this activity of mind, all this exertion, would be either wasted or delayed, were there not some focus, some central attraction, around which the luminous bodies may revolve, capable of communicating and diffusing their light to every place in every country. (Applause.) I would ask you, how could this centre of attraction be furnished in a stronger degree, and exercise a more powerful influence, than has been done by His Royal Highness in being induced to place himself at the head of this Society, in immediate and familiar connection with every branch of science, and in communication with the heads of every department of art? (Applause.) I feel that I need say no more, for I am sure that you agree with me that it is from this disposition so frequently evinced, and never more effectually and usefully evinced than on this day, that you are indebted—I will not say for the cause and creation of such a spirit in the country—but for the mode in which it has been accelerated in its pace and brought to act in perfect unison and harmony, science with science, and art with art, and all deriving benefit from his patronage, and advantage from his countenance. (Applause.) I beg to propose, therefore, that you now vote your thanks to His Royal Highness for his attendance here this day, and for his conduct in the chair.

Lord Colborne, in rising to second the motion, said: Ladies and Gentlemen,—I think, after the speech to which you have just listened, it would be out of place for me to occupy your time for more than a few minutes. I am sure there is no one here this day who is not fully aware of the assistance and support which His Royal Highness gives to every work of art and science—not only in knowing and fully appreciating them, but from the kind way in which he takes up these objects, and the judgment he shows in regard to them. I am sure that all present must feel the deepest gratitude for the way in which he supports this and kindred Institutions. I shall not say more, therefore, but content myself with confirming the remarks and seconding the Resolution of my noble friend. (Applause.)

The Resolution having been unanimously agreed to,

His Royal Highness Prince Albert said: I thank you most sincerely for the kind expressions which have fallen from your lips on my behalf, and for the kind manner in which they have been received. I must confess that these expressions of kindness on the part of the assembly make me blush. In coming here this day to give the Prizes which the Society have awarded, I have only performed my duty as President of the Society,—and the performance of a duty is at all times a pleasure to me. (Applause.)

The proceedings then terminated.

## APPOINTMENT OF SECRETARY.

On Saturday last the 11th inst., the Council had interviews with the various candidates for the office of Secretary, and after considering their respective testimonials and the statments which they had made, the Council unanimously agreed to select Peter le Neve Foster, Esq., formerly Treasurer to the Society, and to place his name on the List for election, as Secretary, at the ensuing General Meeting on the 6th of July.

## ADVERTISEMENT DUTY.

THE Council of the Society of Arts desire to call the attention of the Institutions in Union to the following amended Resolution, put forth by the Chancellor of the Exchequer, relative to the Advertisement Duty:

> "For or in respect of any advertisement contained in or published with any Gazette or other Newspaper, or *any other periodical paper, or in or with any pamphlet or literary work*," 6*d*. is to be imposed.

The Council have determined in the interests of the Union, to represent to the Chancellor of the Exchequer, as forcibly as they can, the evil effects which must be produced by a tax on a class of advertisements hitherto exempted. The Council have forwarded to the Chancellor of the Exchequer the general Resolution as to the fiscal restrictions on Paper, Advertisements, News, and Foreign Books, carried unanimously at the recent Conference. They now invite the Institutions to follow up the convictions then expressed, and to lose no time in exerting their influence, so that the burden of fiscal restrictions upon the cheap supply of information may, at least, not be increased. The Council purpose to lay their views on this subject before the Chancellor of the Exchequer, not only by memorial, but by deputation. The attention of the Institutions is directed to the importance of making these representations, which must, of course, be of an entirely non-political character, as weighty as possible. Circulars have been addressed to Publishers, asking for their co-operation.

## NOTICE TO INSTITUTIONS.

The Council has great pleasure in announcing that General Sir Charles Pasley has placed at their disposal for distribution among the Institutions in Union a limited number of copies of his treatise, entitled "Complete Course of Practical Geometry." It is requested that those Institutions who desire to possess copies of this work will apply to the Secretary of the Society of Arts immediately, that they may be included in the parcel to be forwarded next week.

Mr. L. Levi has also placed at the disposal of the Council a number of copies of the Report of the meeting held on 17th May, in the London Tavern, for the formation of a Mercantile College in the City of London.

## TRADE COLLEGES.

THE following tabular view of the course of study pursued at the College for Trade and Industry, at Amsterdam, will be read with interest:

### I.—THE TRADE SCHOOL.

*Third Class—First Year.*

- Language
- History
- Geography
- Arithmetic
- Algebra, Arithmetical and Geometrical Proportions, Logarithms
- Geometry
- Natural Philosophy, and Chemistry
- Writing and Drawing

*Second Class—Second Year.*

- Mercantile Arithmetic
- Book-keeping
- Coins, Weights, and Measures
- Trade Terms, Counting-house Customs, &c.
- Applied Geometry
- Applied Natural Philosophy, Practical Chemistry
- Knowledge of Commercial Articles
- History
- Geography and Ethnology
- Drawing

*First Class—Third Year.*

- History of Trade
- Marine Commerce, Rules of Exchange
- Trade Corporations, Banking, Partnership, &c.
- Rudiments of the Theory of Trade, Politics
- Principles of Government
- Elements of Zoology, and Botany
- Elements of Technology
- Dutch, and other Languages
- Dutch History
- Astronomy

*A—Classes for Merchants.*

- Theory of Trade and Politics
- Law
- Trade Statistics of Holland
- National Economy
- Consideration of Dutch Trade in relation to other Countries
- Commercial Treaties, Duties, &c.
- Elements of Exchange, Monetary Systems, Banking
- Knowledge of Articles of Commerce

*B—Classes for Intending Colonists.*

- Language, Geography, and Ethnology of Dutch Colonies
- Analytic and Applied Chemistry
- Mineralogy and Geology
- Zoology and Botany
- Technology
- Agriculture in General, especially that of the Tropics
- Navigation
- Topography and Geodesy
- Medicine

*C—Classes for Supercargoes, Agents, etc.*

- The Chief Foreign Languages
- The Marine and Commercial Laws of Foreign Countries
- Applied and Analytical Chemistry
- Mineralogy and Geology
- Botany and Zoology
- Technology
- Ship Book-keeping, Ship Measurement
- Ship-building
- Navigation
- Agriculture

*D—For Ship-agents, Ship-brokers, Underwriters, etc.*

- The Marine and Commercial Laws of Foreign States
- Navigation
- Ship-building and Management of Ships
- The Doctrine of Chance, as applied to Insurance, etc.

*E—Dry Merchants, etc.*

In addition to the preceding.

- Zoology and Botany
- Mineralogy and Analytic Chemistry

### II.—THE INDUSTRIAL SCHOOL.

*Fourth Class.—First Year.*

The instruction is similar to that given to the Third Class in the Trade school.

*Third Class.—Second Year.*

- Algebra
- Geometry
- Descriptive Geometry
- Applied Natural Philosophy
- Practical Chemistry
- Mechanics
- Mineralogy and Geology
- Botany and Zoology
- Book-keeping

*Second Class.—Third Year.*

- Algebra, to the commencement of the Differential and Integral Calculus
- Higher Geometry
- Descriptive Geometry
- Practical Chemistry
- Natural Philosophy, mathematically treated
- Applied Geometry
- Mechanics—Statics; Hydrostatics; and the Elements of Dynamics
- Technology
- Manufactures
- Architecture
- Geography and Ethnology
- Elements of Astronomy

*First Class.—Fourth Year.*

- Differential and Integral Calculus
- Mechanics—Dynamics
- Hydraulics
- Architecture, mathematically treated
- Elements of Marine Architecture
- Building Materials
- Descriptive Geometry
- The Calculation of Probabilities
- Topography and Geodesy
- Medicine
- Industrial Economy
- Industrial Jurisprudence

## PROPOSED BIRMINGHAM AND MIDLAND INSTITUTE.

BIRMINGHAM, with upwards of 200,000 inhabitants, with vast industrial resources, and great commercial energy and intelligence, possesses no Literary or Scientific Institution commensurate with the requirements of the town and district. To supply this want, the outline of a comprehensive scheme was adopted at an influential Meeting, held on the 10th of January, 1853, under the presidency of the Mayor of the Borough. Since that time a Committee, then appointed, has been actively engaged in devising the means of accomplishing the design.

It is proposed that the Institute shall consist of two Departments: one a GENERAL DEPARTMENT; the other, SCHOOLS of INDUSTRIAL SCIENCE. Under the former head will be embraced—1st, *The Literary Branch;* comprising general and reference Libraries, Reading Rooms, accommodation, as far as may be practicable, for the Literary Societies of the town, and Lectures on subjects kindred to this branch; 2nd, *Museums;* 3rd, *a Collection of Mining Records;* 4th, *Lectures on general scientific subjects;* 5th, *Periodical Meetings* for the reading and discussion of original communications, upon the plan of the Sections of the British Association; and 6th, *a Gallery of Fine Arts* for the reception of examples of Painting and Sculpture.

The other department will be a SCHOOL of INDUSTRIAL SCIENCE, the Members of which will be provided with Systematic Lectures and Class Instruction in the various branches of Science, with especial reference to their particular occupations; and will also partake of the more important advantages of the General Department. The Lectures will include Chemistry, as applied to the various Manufactures and Agriculture, Mechanics, Metallurgy, Mineralogy, and Geology, Ventilation of Mines, and Mining Engineering. The education of our Artisans, Practical Miners, and others, in the scientific principles of their daily avocations will thus become a primary object of the Institute.

The MUSEUMS, common to both departments, will be divided into three distinct heads. The *first* to be principally devoted to Geology, Mineralogy, their economic application, and such parts of Natural History as illustrate these Sciences; also, those animal and vegetable productions used as raw materials in Manufactures. The *second* will be devoted to Manufactures, particularly those of the District, comprising Specimens of Articles in their different stages of process, and finished Articles of different dates and countries. The *third* will include Models and Specimens of Machinery, Tools, Furnaces, and other instrumental means and appliances used in the various Manufactories.

The Committee is engaged in making arrangements for associating the SCHOOL OF DESIGN with the new Institute, free of all charge, by which greater facilities will be afforded, and increased accommodation given for more successfully attaining its object. This will enable the Committee to place the Building of the Society of Arts, in New-street, at the disposal of the SOCIETY OF ARTISTS, for their Annual Exhibition of Pictures, and will afford them the opportunity of more completely developing their proposed educational plans.

An important feature in the proposed Institute is its *permanence.* This will be secured by the building being vested in the Corporation as trustees in perpetuity, thus giving to the Donors a guarantee for the stability of the Institution to which they are invited to contribute.

The Committee state that the advantages to be derived from the establishment of such an Institute are as follows:—The MUSEUMS will be of the greatest utility to persons engaged in the Arts and Manufactures; to the Ironmaster, by the exhibition of the different kinds of Ores and Iron, and Models of Furnaces and Machinery used in different parts of Britain, America, and the Continent; to the Architect and Builder, by the exhibition of Building Materials, with records of their cost and durability; and to the Manufacturer, Designer, and Modeller, by the exhibition of Raw Materials, and of Finished Articles, remarkable for their artistic beauty, novelty of construction, or excellence of workmanship. The collection of MINING RECORDS will be of peculiar value in this district, by affording information as to the position of old Workings, and the situation and peculiarities of the Strata in which the Minerals occur. The concentration of the two Branches in one Institution will afford the means of obtaining Lectures of a higher order than could be accessible to either Branch separately; and the Classes of Industrial Science will confer an important benefit in placing within the reach of the Pupils a knowledge of the scientific principles involved in the various departments of Manufactures and Art.

## MANUFACTURE OF PAPER FROM COW-DUNG.

BY GEORGE LLOYD, M.D.

ATTRACTED to the subject of paper-making by an accidental circumstance, and aware of the very great variety of vegetable substances that have from time to time been proposed to be so employed, and of those which are actually in use, wholly or in part, as substitutes for the costly "filthy rags," I was induced to make trial of the fibre derived from some of our common grasses. Reflecting, too, upon the condition of the fibre of the flax plant having undergone all the destructive chances and changes during a course from the living plant to the almost decayed fragment of rag, and contemplating the wonderful tenacity and endurance of the fibre in resisting the destructive agency of all the repeated mechanical and chemical operations to which it is subjected up to the period of its becoming fair linen cloth, and afterwards, through the incessant action of wear, and the no less destructive operations of the laundress,—and the transition through the rag-bag to its committal to the paper-mill, in which the fibre is finally resolved into extreme tenuity; and observing that the fibre of many plants passes uninjured through the alimentary canal of the cow,—I concluded that the straw of the flax plant might be advantageously employed in the manufacture of paper, having previously yielded a considerable amount of nourishment as food for cattle, which in the ordinary treatment of the plant is entirely wasted. I accordingly instituted some experiments, both in the use of flax-straw as food for cattle, and in the conversion of the same straw, after its passage through the alimentary canal, into paper.

Assuming the straw of the flax plant to contain the same nitrogenous elements as the seed-vessels, it appeared probable that when cut into chaff, and mixed in varying proportions, either with the chaff of certain grasses, selected for their strength of texture, as common dog's-tail grass (*cynosurus cristatus*), or with that of common hay, it would, in the process of mastication and digestion, yield a considerable portion of flesh-making nutriment; and by the same natural process all, or the greater part of the soluble matter, being thus separated, the pure fibre would remain in the excreta, which being retained in convenient receptacles under the feeding-stalls or boxes, which should be "boarded," or perhaps half-boarded, and the liquid portion being separated by pressure, after a certain degree of dilution with water, would be preserved as manure to be returned to the soil.

We have thus at command a natural and most economical "rag-engine" for the separation and comminution of the fibre in the jaws and teeth of the ruminant machine—a series of macerating vessels in the stomachs and alimentary canal in which the soluble matters are detached and removed, not as waste, but destined not only to keep in repair the machine itself, but by increase of weight to add most materially to its value.

As the present purpose is not so much to treat of the feeding qualities of flax-straw or of the value of the liquid portion of the excreta thus obtained for the purposes of manure, but rather to show that an useful and economical paper can be made from the solid portion, it will be sufficient to state that in the experiments undertaken last year, the nutritious properties of the flax-straw were very evident, notwithstanding the increased time and labour in chewing the cud of such tough material demanded; and with respect to the value of the liquid manure nothing need be added to the remark that its qualities will of course greatly depend upon the nature of the food from which it is in part derived; so that whatever be the value of flax-straw when so used as compared with other substances, the value of the excreta as manure will be in the same proportion. One remark may, however, here be made with respect to the money value of the straw, which to cultivators is of prime importance. A good crop of flax such as spinners would give the best price for, would be too valuable for a farmer to use as food for cattle only, and even in reference to the ultimate use of the fibre when freed from the soluble nutritive matter for paper-making in the manner here proposed, the cost might perhaps be too great at present; but the quality of straw that would be of the highest value for making yarn would not be that which would be preferred for food, and for paper-making the inferior would in all probability be quite as useful. It is a common complaint of persons attempting to grow flax in new districts that they cannot find a market for it, and consequently many have been deterred from growing this plant by having no use for it, nor being able to sell it advantageously. Now though the cultivators of flax generally will not be able to derive the full advantage of the proposed novel use of the straw by becoming paper-makers, yet it may oftentimes induce them to decide in favour of its cultivation to know that both the straw and seed may be used profitably as food, and that an irregular or "ragged" crop which would be of comparatively little value to sell to the flax-spinner, would still prove remunerative to the grower.

The liquid portion of the cow-dung having been separated by mechanical pressure, and conveyed into tanks to be from thence distributed upon the land, the solid matter undergoes a washing in water, and is then subjected to the action of steam in closed vessels; it is afterwards allowed to macerate in water for some days (the length of time varying according to the atmospheric temperature) so as to admit of a certain degree of fermentation, and again washed, by which means the fibre is more perfectly freed from adventitious matter, which being present not only deteriorates the colour of the paper, but greatly interferes with its quality in strength and softness. In this state it may be regarded as in the condition of what the manufacturers call "half-stuff;" and so far the work of the rag engine has been performed by the living machine; and the material is bleached by means of some of the ordinary compounds of chlorine to whatever extent may be desired.

The bleaching accomplished, the "stuff" is ground in water by the ordinary engine into "pulp," and manufactured into paper in the usual way.

## EQUATORIAL MOTION FOR TELESCOPES.

BY JOSEPH HOPKINS, OF WORCESTER.

Having taken out a patent for "a mode of obtaining a straight line parallel to the earth's axis, or of making the axis of a tube or the axis of a telescope parallel thereto," which, amongst other purposes, may be applied to the construction of sun-dials, by which minute portions of time might be marked, or to the production of equatorial motion in a telescope, without the preparatory aid of levels or divided circles, and without the usual preliminary requirements of a knowledge of the latitude and direction of the meridian, I am anxious to lay before the Society the application of the principle to an instrument which may perhaps be not inaptly named "The Portable Observatory."

Upon a common tripod telescope-stand a brass tube is so mounted as to have a horizontal and a vertical motion, each of which may be clamped, so that the direction of the axis of the tube being once determined, its position may be rendered permanent. The tube is five inches in length; if now at one end of it were inserted an eye-piece, in the centre of which was drilled a hole, about one-tenth of an inch in diameter, and at the other end an object cover, with a central circular aperture of the diameter of one-fourth of an inch, the eye of an observer, on looking through the smaller of these apertures, would take in a field of view the circumference of which would be equal to that of the circle which Polaris apparently describes round the true polar point; and if by the requisite horizontal and vertical motions these circumferences be made to coincide, their centres will also coincide, and the axis of the tube will be parallel to the earth's axis.

The coincidence here spoken of may be nearly enough obtained, where a plain tube only is used, by viewing the Pole Star on that part of the circumference of the circular diaphragm nearest to the constellation Cassiopeia; but as in the instrument now brought before your notice a small telescope is used, the axis of which is to be made parallel to the earth's axis, I shall proceed to show the mode of obtaining this parallelism.

On the outside of the tube of the small telescope are two circular rings, which are carefully ground and fitted into collars in the brass tube; the axis of the telescope is then made to coincide with the common axis of these collars, and the centre of its diaphragm is made coincident with this axial line, the diameter of the diaphragm being such as to give a field of view to the telescope of 2°. 57′, being double the North Polar distance of Polaris.

A brass sector is made to move round the upper part of the brass tube at right angles to it, carrying an index with two small perforations through which, when the stars E and ξ, Ursæ Majoris, are seen by the observer,—the eye taking in at the same time the field of view of the small telescope, the position to which Polaris must be brought on the circumference is pointed out by the line of light seen through the index.

As a test of the correctness of its place thus found, turn the small telescope about its axis in the collars of the tube, when through an entire revolution of the telescope the star should continue to cling, as it were, to the same point of the circumference of the diaphragm. The axis of the collars of the tube being thus made parallel to the earth's axis, we remove the small telescope and sector, insert the axis, which is fastened by clips to the larger telescope, and fitted by rings of bell-metal into the collars of the tube, attaching to it the Right Ascension circle with its clamp. It is evident, that to whatever height the telescope be elevated, if it be turned about this axis it will move in planes parallel to the Equator; and if it be directed to a star, a motion given to it from east to west by the hand, or by a Hook's joint, will serve to keep the object in the field of view.

I have chosen, however, to give motion to the telescope by the action of a floating syphon, the weight carried by the float being connected with the right ascension circle by a cord clamped in one of its grooves. The upper edge of this circle is exactly 24 inches in circumference, the lower edge 25 inches nearly; the former having a proportion to the latter equal to that of the sidereal to the mean lunar day. Each of these circumferences is grooved to the same depth,—the thickness of the cord should be double the depth of the groove.

The large cylindrical pan is about 18¾ inches in diameter; it contains in a depth of 12 inches, 95·7 pints. This quantity of water should be run off by the syphon in twelve sidereal hours. The rate (which should be adjusted while the telescope is in motion) is obtained by raising or lowering the syphon by the rack and pinion, till it delivers one gallon in one mean solar hour, or one pint in 7½ minutes.

The rate thus adjusted, if the motion of a star is to be followed, place the cord in the upper, if of the moon, in the lower groove of the right ascension circle, and let it hang by the small plummet over the pulley, fixed to one of the legs of the stand.

The telescope directed to the object, the cord clamped and the syphon in action, no movement of the instrument will take place till the cord is so stretched as to overcome the friction of the collars in the tube; we therefore turn the milled head at the upper edge of the pan, which, by opening the stop-cock, causes the floating weight to sink rapidly; this motion being stopped when the object appears in the centre of the field of view, the action of the syphon alone will cause it apparently to remain stationary.

I wish it to be distinctly understood, that the instrument now submitted to your notice was designed to show (independently of its application to the production of equatorial motion) the methods by which an extended wire, the axis of a tube, or the axis of a telescope, might be made parallel to the earth's axis, to a sufficient degree of exactness to make it available for astronomical observations.

Other simpler forms might be adopted where one telescope only need be used, or a telescope and its finder; the latter having a field of view of 2° 57′ might be so mounted as to produce the equatorial motion required.

Where very powerful telescopes are used, the smaller one by which the polar axis is determined might have a field of view of 3°, and the exact position of the Pole Star near its circumference might be determined by a micrometer adapted for the purpose; this would admit of the requisite corrections for refraction. As differences in the temperature of the water occasion some little variation of rate in the quantity delivered by the syphon; the rack-work should be graduated for these differences or self-regulating clepsydras may be constructed, either by using two cisterns and two syphons (one of the latter acting as a supply-pipe to the cistern carrying the float); or if one cistern only be used, by a thermometer carrying a piston attached to the syphon, the bulb of the thermometer being fixed under the lower surface of the float.

If the telescope be not well balanced about its centre of gravity, more or less weight will be required to move it as its direction is varied. If, however, the float cover a large surface of water, and the syphon when adjusted for the mean temperature be at some depth below this surface, no perceptible variation of rate would be occasioned.

The action of the clepsydra produces a smoothness of motion not to be surpassed; and I feel assured it might be adapted to the requirements of an Observatory.

JOSEPH HOPKINS.

## LOCAL LECTURE ASSOCIATIONS.

THE following papers, showing the mode in which the North-west Hants Lecture Association is managed, are well deserving of consideration. The Association has been formed by the Hon. and Rev. Samuel Best, of Abbott's Ann, Andover, who acts as Secretary, and who, by his local influence and energy, is fast collecting the materials for a most useful and powerful association:

### RULES.

1. The object of this Association is the promotion of Lectures on scientific and literary subjects in village schools and reading-rooms.

2. The range of the Association shall comprise North-west Hants, or the districts included in the Kingsclere, Andover, Basingstoke, Stockbridge, and Whitchurch Unions, and immediately adjoining parishes.

3. The Members shall be those who desire to promote the object of the Association by the delivery of Lectures, or by subscribing towards the expenses. They must be elected by the Committee.

4. Members shall be divided into two classes—Lecturers and Subscribing Members; 1*l.* annually shall be the subscription of a Subscribing Member. Honorary Members may be elected by the Committee.

5. The arrangements for each season shall be made at a Meeting, held at such time and place as a Committee, consisting of five Members and an Honorary Secretary (chosen annually for the management of the Association), shall appoint.

6. The subscriptions shall be devoted in aid of the objects of the Association, or appropriated to the purchase of diagrams, charts, books, or papers for the use of Lecturers. These shall be the property of the Association, and be deposited with the Secretary for the use of the Members.

7. The Association contemplates lectures in Village Schools and Reading-rooms otherwise unsupplied, and as much as possible on the principle of mutual assistance; a Lecturer's School or Reading-room being entitled to one lecture gratis, for every lecture given. It is not, however, intended to exclude either villages or towns having no resident members, on a payment of 10*s.* annually in villages, or 1*l.* in towns, being made towards the general fund; nor to interfere with the freedom of any member lecturing elsewhere.

(*Form of Circular Letter.*)

DEAR SIR,—Under the impression that it is very important to provide for carrying on the course of Education commenced only in the School-room, and of assisting those who are desirous of carrying out a system of self-instruction; will you allow me to draw your attention to the enclosed copy of Rules, and to ask your co-operation? The great difficulty of the Lecturer is often the want of illustrative Diagrams, while that of the Institute or Reading-room is a succession of Lecturers to occupy the appointed evenings of the season. In the desire to supply both of these wants the Association, whose Rules I forward you, has originated.

Leaving every Institution at perfect liberty to carry out its own views on its own conditions, it will be the object of the Association simply to assist its efforts by arranging for the supply of Lecturers, and providing Diagrams &c. for their use.

I beg to subscribe myself,
Very faithfully yours,
*Secretary.*

## ELECTRIC TELEGRAPH IN BRITISH INDIA.

The following particulars relative to the rise and progress of the Electric Telegraph in India, are given by Dr. O'Shaughnessy, in the prefatory notice to his little treatise on this subject.

"A brief sketch of the measures connected with the construction of the Electric Telegraph in India, will form the most appropriate introduction to this 'Manual of Instructions.'

"In April and May, 1839, the first *long* line of Telegraph ever constructed in any country, was erected by the writer of these pages in the vicinity of Calcutta. The line was twenty-one miles in length, embracing 7,000 feet of river circuit. The experiments performed on this line, removed all reasonable doubts regarding the practicability of working Electric Telegraphs through enormous distances; a question then, and for three years later, disputed by high authorities, and regarded generally with contemptuous scepticism.

"It is never too late to acknowledge an obligation. In the experiments then carried on, I received the warm aid and support of Dr. Wallich, then Superintendent of the Botanic Gardens of Calcutta, now Vice-President of the Royal Society of London.

"One terminus of the line was placed in his house. All the resources of his establishment and library were held at my disposal. He saw at a glance the marvellous future which these and simultaneous experiments in other countries foretold; and with his high name he protected the experimentalist from much of the derision which his attempts excited in the community of Calcutta.

"The experiments having been completed, and their results published, the line was taken down.

"In 1850, a despatch from the Court of Directors to the Government of India, recalled attention to the subject. The Government addressed the Military Board of Bengal, and reports were called for by the Board, from Lieut.-Col. Forbes, of the Engineers, and from myself.

"On these reports, dated December, 1850, being placed before Government, an experimental line of telegraph, half subterranean, half overground, and thirty miles in length, was directed to be constructed.

"This line was commenced in October, 1851, and opened to Diamond Harbour, in December of that year. In the following May, a branch was led to Moyapore. In August and December it was extended to Kedgeree, eighty miles distant by the line followed; and in March, 1852, the rivers Hooghly and Huldee were crossed, and the line from Calcutta to the sea opened for official and public correspondence.

"These results, having been duly reported, were under the consideration of the Supreme Government of India, when hostilities commenced in Burmah. The services of the telegraph were thus brought into instant and practical requisition, and its incomparable capabilities tested with complete success. The "Rattler," steam-frigate, bringing intelligence of the first operations of the war, had not passed the flagstaff of Kedgeree, on the 19th of April, when the news of the storming and capture of Rangoon was placed in the hands of the Governor-General in Calcutta, and posted on the gates of the Telegraph-Office, for the information of the public.

"On the 14th of April, 1852, Lord Dalhousie, as Governor of Bengal, laid before the Government of India a long and deeply-interesting Minute, in which his Lordship proposed the construction of lines from Calcutta to Agra, to Bombay, to Peshawur, and Madras; and the Deputation of the author of this Manual to England, to give evidence before the Court of Directors, and assist in the dispatch to India of the requisite materials and stores.

"I left India on the 3rd of May, 1852, and reported my arrival at the India House on the 20th of June. On the same day I had the gratification to hear from the Chairman of the Court of Directors, Sir James Weir Hogg, that the Governor-General's propositions, which arrived *viâ* Marseilles on the 14th, had been already sanctioned by the Court of Directors, and approved of by the Board of Control; and that a despatch from the Court was already on its way to India, in reply to the Governor-General's letter.

"Such rapidity in the dispatch of an important measure is, perhaps, without a parallel in any department of Government. All subsequent steps were taken with proportionate speed. The requisite contracts were issued for all the stores, before the 1st of August. Sixty enlisted artificers were placed in training at Warley; an inspection of the home and foreign telegraph lines undertaken and completed by the 15th of November; collections made of all the instruments in use in Europe and America: these pages prepared for the guidance of the persons to be employed on the works in India; and voluminous reports, with estimates and drawings, submitted from time to time on every step of these proceedings.

"The accompanying list of the materials and instruments ordered on the 1st of August, 1852, will show the enormous scale on which the operation was sanctioned, and the rapid rate in which the preparations have been made:

| | Tons weight. |
|---|---|
| Iron rod, No. 1 galvanised, 5-16th inch; weight per mile, ½ a ton; length, 5,600 miles | 2,800 |
| Iron screw piles, 46,000, each 76 lbs. | 1,560 |
| Gutta percha covered copper wire, 700 miles. | |
| Iron wire, galvanized, No. 8, 500 miles | 100 |
| | Number. |
| Oak Brackets | 48,000 |
| Galvanized wrought iron caps | 48,000 |
| Binding screws for ditto | 48,000 |
| Stoneware insulators | 96,000 |
| Galvanized screws for ditto | 96,000 |
| Straining-machines | 20 sets of each. |
| Wire straightening ditto | |
| Gutta percha tool-chests | |
| Sets of sundry tools | |
| Telegraphic instruments and samples of stores, &c., from all English offices; also from America, France, Baden, and Prussia. | |
| Electric clocks, printing presses, turning lathes, wire drawing-machines, and silk covering, taping, and ribbening machines; from Hopkinson and Cope, London; Whitworth and Co., Manchester; Holtzapffel, London; Shepherd and Son, London; Mr. Physick, of London; &c., &c. | |

"Of all the above stores, and many others not included, there was not a single item manufactured or procurable on the 1st of August, 1852."

## FREE LABOUR—COTTON AND SUGAR.

On Wednesday evening a lecture was delivered at the London Coffee-house, Ludgate-hill, by Mr. Bourne, on the subject of the Production of Cotton and Sugar by means of Free Labour. Mr. Palmer, barrister, took the chair.

Mr. **Bourne** said the object of his lecture was to show that an adequate supply of sugar and cotton might be obtained, the result of free labour, from our West India Colonies. The greater portion of the lecture was devoted to prove, that the great requisite in the West India colonies was, the adoption of an improved system of draining by means of the draining plough—and he referred to the successful experiments which had been made in the island of Demerara. He referred also to the report of Dr. Shear, in support of his opinions, and to the petitions which had been signed by some of the most successful planters, and by some of the most eminent merchants in the West Indies, for the application of the Drainage Act. The old system of draining compelled it to be done by means of manual labour, which was incompatible with cattle labour, and the improved system of agriculture. He had himself resided for a number of years in the West Indies, and from his official experience, could speak with confidence on the subject. Were the sugar planters able to adopt the improved system of drainage, he felt confident that most of the difficulties they laboured under would be removed. The value of the drainage plough might be judged of by the fact that four horses, two ploughs, and corresponding implements, would lead to a saving of fifty negroes, and three times the amount of the present returns would be secured with little or no extra cost. By means of improved drainage there would be no difficulty in producing a supply of cotton sufficient to drive the slave labour out of the market. The colony would, besides, be made much healthier, and the cost of provisions be so reduced as to induce emigration, and a sufficient supply of free labour. In conclusion, he alluded to the monstrous evils of the slave system, and to the deep interest which, upon every ground, the people of this country had in entirely destroying it.

The **Chairman** said, with reference to a suggestion thrown out by Mr. Bourne, for the convening of a large meeting to consider the subject, he was of opinion that such a measure would be attended with success. He also thought that Mr. Bourne was well-deserving the thanks of the meeting for the lecture he had delivered.

Mr. **Denoon** then moved a vote of thanks to Mr. Bourne for the able and instructive lecture he had delivered.

Mr. **Edgar**, who had been for some time a resident in Kaffirland, seconded the resolution, and in doing so, said the Kaffirs would be easily induced to cultivate cotton, as the climate was well suited to it, and they were very anxious to obtain the manufactures of England.

The Rev. Mr. **Ward**, a gentleman of colour, having said a few words as to the interest which all classes in this country took in the abolition of slavery, the motion was agreed to.

A committee was then appointed, with power to add to their number, to consider what means should be taken for carrying out the plan proposed by Mr. Bourne and to report to a future meeting.

Thanks were then given to the chairman, and the business terminated.

# HOME CORRESPONDENCE.

## CHRONOMETERS.

Sir,—I should not have noticed Mr. Loseby's letter but for the last sentence in it, in which he rather triumphantly asks which of my opinions I intend to be believed, —that expressed in my Exhibition Report, that his invention for compensating balances was the best; or that which I expressed the other night, that Dent's and several others are better than his.

I thought I had explained that point sufficiently, in Mr. Loseby's hearing; and I certainly gave him credit for being prudent enough not to invite me to give a still more public explanation of it. However, as he asks for it, he shall have it.

When I wrote the Report, I said his secondary compensation was "probably the best," because I believed it was, merely from the fact of his chronometers having been most frequently the first in the Greenwich trials. And if Mr. Loseby had been quiet, I should probably have remained in the same belief till now. But as he thought fit to express his indignation in several ways at the Jury not having distinguished his chronometers from all others in the world by a council medal, I was led to examine the Greenwich lists a little more closely, for the purpose of ascertaining the actual amount of superiority of his invention over others for the same purpose. And then I found, to my surprise, that the supposed superiority disappeared altogether when properly examined; and that (as I explained at the meeting a fortnight ago,) his chronometers had *never once been first in that particular respect for which his invention was designed*, and for which he has been bothering the Admiralty for a public reward for the last four or five years.

Mr. Loseby knows that in the very set of Parliamentary Papers of 1849, out of which he has picked what suits his purpose, there is a report from the Astronomer Royal to the Admiralty against giving him a reward, on the two grounds that his invention was not the first for the purpose, and that Mr. Airy saw no reason why one at least of those previously invented, viz., Dent's, should not answer quite as well, as in fact it has, and better. In 1850, and again in 1852, he made another attempt upon the Admiralty; and still failing in his object of getting a reward, he got copies of his applications moved for, as a sort of Parliamentary advertisement. And then for the first time came out that division of the Greenwich lists into cold, mean, and hot periods, which I had communicated to Mr. Dent; and which, as it would never have been *made* but for Mr. Loseby's complaints of his ill-treatment by the Exhibition Jury (or by me individually, if he prefers it), would never have been *published* but for his complaints of the Admiralty and the Astronomer Royal not duly appreciating the importance of his invention.

Of those calculations I do not intend to say any more. Mr. Loseby may make out as many Tables as he pleases to prove something else: he cannot alter the fact which that division of the trials into cold, mean, and hot periods of two months each clearly shows; viz., that his chronometers do not keep the same rate in the three periods so nearly as those of several other makers. And I will add this further remark: the general success of Mr. Loseby's annual chronometer at Greenwich is evidently due to the care and skill which he bestows on the getting up of that one instrument, more than to his peculiar method of compensation, since he is never the first in respect of compensation; and therefore it is further evident that if he bestowed the same attention on a chronometer with one of the other kinds of compensation, he could make it beat his own still more decidedly; or, to put it the other way, if Mr. Loseby's compensation was generally adopted for chronometers made with only the average amount of care and skill, it would probably fail very decidedly as compared with several other methods now in use.

As I observe also a letter from Mr. Wenham on glass balance-springs, I take this opportunity of giving greater publicity to the remark, that if they answer at all, the necessity for either Mr. Loseby's or anybody else's contrivances for secondary compensation is at an end, on account of the exceedingly small primary compensation required by glass springs; and I must say that the violent denunciations of glass for balance springs which we heard the other night seemed to me to have just as much foundation in experience as the equally violent denunciations against cast iron for the wheels of turret clocks, which the same set of gentlemen indulge in whenever they have an opportunity—without much success.

Your obedient Servant,

E. B. Denison.

### GRATUITOUS LECTURES.

Montpellier House, Brighton, June 11th, 1853.

Sir,—The very interesting Debate on Lectures and Class Instruction which took place at the Rooms of the Society of Arts, on Thursday last, is likely, I think, to produce a feeling of discouragement in the minds of those who, not being professed lecturers and teachers, have been, and are now, flattering themselves that their endeavours to extend information to the masses by these means are not altogether worthless. In their earnest desire to recommend trained teachers and lecturers, the Institutes Committee, and many of the Delegates from Literary and Mechanics' Institutions, threw cold water enough on *Miscellaneous Lecturing* and untrained teachers, to quench the zeal of all except the most ardent; and in so doing, were, in my opinion, guilty of great injustice to a very large number of philanthropic gentlemen who have mainly contributed to the promotion of national intelligence, and on whose exertions the country has *chiefly* to depend.

I am convinced that it is very far from the intention of the Society of Arts to produce any relaxation of the efforts of voluntary unprofessional lecturers and teachers, and I was anxious to elicit a distinct recognition of their value from the Conference; but so many gentlemen had opinions to express, that I found it impossible to get a hearing. As the representative of an Institution (the Brighton Mechanics' Institution), which has been wholly sustained for three years by these means, and as a Vice-President of the Brighton Literary and Scientific Institution, which has been maintained in like manner for twelve years, having received between 200 and 300 miscellaneous lectures, delivered to audiences varying from 100 to 400 persons, I feel justified in requesting that you will admit this word of appeal to the sympathies of the Society for a class of fellow-labourers in the cause of National Education; the value of whose services should not be under-rated, because they are given without fee or reward, and for which the Society of Arts is not prepared to provide any substitutes.

Yours, &c.,

H. Stein Turrell.

### LECTURERS.

13th June, 1853.

Sir,—At the Conference the other day, during the long discussion which took place on the subject of Lectures, nothing was said on behalf of the Lecturers, as to the manner of their reception on visiting Institutions in the country to deliver their Lectures.

They are men of enlightened minds and accomplishments, more or less imbued with special and general science or literature, and worthy of being received and entertained in a courteous and a generous spirit; but is this always done with the hospitality to which they are fairly entitled? I fear not.

In the course of conversation with these gentlemen, they have occasionally mentioned to me, with the expression of sentiments of regret and disappointment, that on visiting Institutions in the country to deliver their Lectures, that they have been allowed to seek for shelter and refreshment in solitude at an inn,—of course at some expense,—have given their Lecture, received their fee, and been allowed to take their departure from the town without any of the civil attention which might have been expected from the Managers of the Institutions.

The little Institution with which I am connected, from its commencement, fifteen years ago, has never allowed any of these gentlemen, with one exception, by his own choice, to go to an inn. They have always been received and hospitably entertained at a private house during their stay, and have given and received additional pleasure by participating in the proceedings of a *soirée* or conversazione, occasionally held after the Lecture, and on taking leave have expressed their willingness to come again, if requested.

Permit me, Sir, therefore to suggest, that gentlemen coming to Lecture to Institutions in the country should not be allowed to incur any expense during their stay; but some one or other of the Committee of Management should have the pleasure of receiving and entertaining the gentleman who does them the honour and the favour of promoting the edification and entertainment of the Members, by imparting to them what he knows on given subjects, and widening among them the boundaries of knowledge.

I remain, Sir, yours, &c.,

Surriensis.

## PROCEEDINGS OF INSTITUTIONS.

Southampton.—The Annual Meeting of the members of the Polytechnic Institution was held on Wednesday evening, H. Clark, Esq., M.D., the President, in the chair, when a report was presented from the Committee of its proceedings during the past year, showing the number of members at present on the books to be 515, being an increase on the year of 39; 244 persons having joined the Institution, and 205 having left it. During the past year there had been an increased attendance at the news-room, for which a larger supply of papers was much needed. The opening of the news-room during the day, could it be effected, would be highly appreciated by the members, and would be of great advantage to the Institution. The demand for books at the library had very much increased, the average number in circulation being about 365. During the past year, from purchases and gifts, about 130 volumes had been added to the library, exclusive of the reports, books, and pamphlets, received from the Society of Arts, amounting in number to about 25. In consequence of the lease of the building now occupied by the Institution terminating at Michaelmas, 1854, the Committee had turned their attention to the subject of obtaining a new building. The effort towards effecting that object, commenced about three and a half years since, was rendered of no avail in consequence of the bequest of the late Mr. Hartley to the Corporation; but as there had been, and still continued to be, difficulties in the way of obtaining possession of this money, and as it was doubtful whether it could be so appropriated as to render it available to the purposes of the Institution, the Committee felt it to be the duty of the members to act independently. They had experienced much difficulty in finding a piece of ground which would be sufficiently large for the purpose, and eligible in point of situation; but there was, however, one site offered them which they considered suitable, and which was sufficiently large to enable them to erect a building which would comprise a lecture theatre capable of containing 1,800 or 2,000 persons, with news rooms, library, museum, and other accommodation suited to the purposes of a large and flourishing Institution; and in conclusion they urged upon the members the propriety of directing the Committee about to be appointed to turn their immediate attention to this subject, which was of vital importance to the welfare of the Institution. The accounts showed the Institution to be in a much better financial position than last year. The following officers were elected for the ensuing year:—President, Dr. Clark; Vice-Presidents, Messrs. Stebbing, Pond, Norrington, and Sims; Treasurer, Mr. Mosely; Secretaries, Messrs. W. Wakeford and W. Weston; Curators, Messrs. Bostock and A. Hillier; Superintending Librarian, Mr. A. Barton; Committee, Messrs. Geddes, Falvey, R. Lankester, H. J. Buchan, Bickers, Dyer, Norman, G. Sharp, J. C. Cox, E. Booth, Wilkinson, Harrison, Levy, Gubbins, and Dr. Marshall.

VENTNOR.—The Annual General Meeting of the members of the Literary and Scientific Institution was held on Friday evening last, J. Weston, Esq., Vice-President, in the chair. The report showed a considerable increase in the number of members, and, notwithstanding the unusually large outlay during the past year, a very satisfactory state of things financially. The following were elected officers for the ensuing year:—Committee, Messrs. G. Jewell, J. Jolliffe, D. Day, W. S. Dodd, B. Bull, J. Newman, T. Bull, W. Bull, T. Butler, E. Bell, F. Trueman, A. Muggridge, W. Bush, H. Cornell, J. S. Keatley; Auditors, W. Ellis and C. Dear; Treasurer, J. Burt.

WHITTINGTON CLUB.—A general meeting of the members of this Club was held on Wednesday evening, for the purpose of considering its present condition, and of taking such steps as might place it upon a permanent and enduring basis. Mr. Mechi having been called to the chair, said, that he met the members that night in better spirits with regard to the welfare of this club than he had on a former occasion, when he saw many things relating to its finances which were of a very disheartening character; but that now, having read the Report of the Committee appointed to investigate the whole of their affairs, he was exceedingly gratified to find that they had reported in a manner highly creditable to themselves, and highly advantageous to the club. They should bear in mind that there were certain fixed expenses which they would have to meet, no matter how few or how numerous might be the subscribers—such as rent and taxes. If, therefore, they wished to succeed, they should bear in mind that it was necessary for them to procure for it a certain number of subscribers. Mr. C. Lushington proposed the first resolution, to the effect that the Whittington Club and Metropolitan Athenæum, from the physical, moral, and social benefits it confers on its members and the public, is an Institution worthy of continued and energetic support. In doing so, he dwelt upon the advantages of the Institution, as a vehicle of education to such young persons as are employed during the day; and regretted the apathy which allowed it to dwindle, and become jeopardized. Mr. Hannen seconded the resolution, which was unanimously adopted. Mr. Maguire then moved, and Mr. Peacocke seconded a resolution to the effect—"That the results of the investigation of the Committee appointed to inquire into the affairs of the Club were calculated to inspire confidence in the future stability of the Institution." Upon this resolution several gentlemen spoke, after which it was unanimously agreed to. The forming of the club arrangements were afterwards considered, and several gentlemen having offered their opinions upon it, the proceedings terminated with a vote of thanks to the Chairman.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

"W. R." would be glad to know where he can find an account of the testing of Trotman's Patent Anchor, as to strength and other qualities.

## MISCELLANEA.

CASTS FOR THE NEW CRYSTAL PALACE.—Some packages have arrived by a steamer from Hamburgh, containing casts for the New Crystal Palace at Sydenham. These packages were of such extraordinary size and weight that it was found to be impracticable to land them at any one of the ordinary wharfs or quays used for the landing and deposit of goods from abroad, and it was therefore found to be necessary, with the sanction of the proper authorities, to land them at Greenwich, where the necessary means was found to exist, in order that they might immediately be landed, and safely removed to their destination.

**Proposed Great Industrial Exhibition for Scotland.**—Our readers have already been informed, through our reports of the Town Council proceedings, as well as the proceedings of the Convention of Royal Burghs, at its late Meeting, that a movement has been set on foot for getting up an Industrial Exhibition for Scotland in our city. A Committee has, we observe, now been formed for carrying out the proposal, who have succeeded in acquiring the option of a central and adequate site on the Calton Hill, which combines, along with the object of an Exhibition, that of completing a great national edifice. We understand that for this purpose it is proposed to complete the National Monument in a temporary style, but so as to correspond in appearance with the section of the edifice already erected. Should this design be accomplished, one interesting object at least will be effected; the public will have presented to them an entire model, on a scale equal in point of size to the original, of the Parthenon of Athens, universally admitted to have been one of the noblest works of Grecian art, but now so sorely dilapidated by time that its ruins may be supposed to present but a feeble idea of its original magnificence. We understand that the Lord Provost and Magistrates of Perth, the Provost and Magistrates of Ayr, the Provost of St. Andrew's, the Provost of Airdrie, the Provost and Magistrates of Queensferry, the interim manager of Kilrenny, &c., have already signified their approval of the undertaking; and that a contractor has expressed his readiness to undertake the execution of the work at an expense of 12,000*l*., and to rely for payment of half the expense on the receipts.—*Scotsman*.

**Architectural Museum.**—This Museum, the object of which is to bring within the reach of every one practically engaged in architecture, and more especially in the revival of ecclesiastical architecture, a collection of casts taken from the best authorities, English and foreign, of sculpture, effigies, mouldings and ornaments, rubbings of sepulchral brasses, tracings of stained glass and mural paintings, pavement tiles, and even original work, where the removal might not be a spoliation; also metal-work, seals, and minor objects of the best periods of Mediæval art. An extensive and rapidly-increasing collection has been formed, and is in course of arrangement in a suitable building taken in Cannon-row, Westminster, where objects of large dimensions may be conveniently deposited in chronological order, thus presenting an opportunity of recalling to memory the rich detail of the objects once visited; to the workman, a new means of improving his taste, of which from his inability of visiting original works he has been hitherto deprived; and to the amateur, the luxury of indulging his love of art by contemplating the finest works of the best periods. To render the Museum as useful as possible, there is attached to it a class, for the study and practice of architectural carving, decorative painting, metal-work, and other subjects connected with architecture; and it is intended to open the Museum in the evening to enable workmen to avail themselves of the only time at their disposal for the purpose of improvement. Arrangements are also in progress for giving a series of lectures on Art Workmanship, to be illustrated by the casts and specimens in the collection.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 7th June*, 1853.

340. Committals (Ireland)—Return.
561. Trade and Navigation—Accounts.
567. Bill—Parish Vestries.

*Delivered on 8th June.*

369. Statistical Papers (India)—Return.
430. Saint Pancras Churches—Returns.
539. Court of Chancery (Ireland)—Accounts.
544. Metropolitan and City Police—Returns.
553. Great Boughton Union—Correspondence.
568. River Tyne—Copy of Instructions.
573. Bill—Common Lodging-houses.

*Delivered on 9th June.*

449. Harwich Election—Report from Committee (a corrected copy.)
508. Army Commissariat and Ordnance—Accounts.
570. Ventilation and Lighting of the House—Report of Committee.
414. Huddersfield Election—Minutes of Evidence.
574. Bills—Tenants' Improvements Compensation (Ireland), as amended by the Select Committee.
578. ,, —Bankruptcy (Scotland), amended.

Dublin University Commission—Report.

*Delivered on 10th June.*

514. Schools and Scholars—Return.
533. Poor Law—Return.
560. East India—Home Accounts.
558. Justices of the Peace, &c.—Abstract of Return.
556. Indian Territories—Third Report from Committee.
511. Dockyard Appointments—Report and Evidence.
478. Office of Speaker—Report from Committee.

*Delivered on 11th and 13th June.*

306. River Tivey—Copy of Report.
521. Cork Election—Report from Committee.
550. Ramsgate Harbour—Report of Capt. Vetch.
579. Bills—Sheriff Courts (Scotland), as amended by Select Committee.
593. ,, —Savings Banks.
594. ,, —Savings Banks' Annuities.
510(*a*). ,, —Succession Duty Schedule.
586. ,, —Expenses of Elections (amended).
592. ,, —Public Works Loan.
601. ,, —Excise Duties on Spirits (as amended in Committee, and on re-commitment.)
602. ,, Customs Duties (amended )

Loan Fund Board of Ireland—Fifteenth Annual Report.

*Delivered on 14th June.*

475. Bills for Murder (Ireland), &c.—Abstract of Return.
437. Nisi Prius Officers—Return.
546. Sweets or Made Wines—Returns.
549. Northern Lighthouses—Abstract of Accounts.
559. Herrings—Abstract Return.
582. Wine and Spirits—Account.
591. Bill—Government of India.

Army—Statistical Reports on Sickness, Mortality, &c.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette*, 10*th June*, 1853.

*Dated 17th May*, 1853.

1218. S. and J. Eccles—Power-looms for figured weaving.

*Dated 25th May.*

1275. W. Babb—Hair trimmings.
1277. W. Birch—Improved sight for cannons.
1279. F. Russell—Raising and lowering window shutters, &c.
1283. S. S. Hall—Preventing carriages running off rails. (A communication.)
1285. W. E. Newton—Generation of steam. (A communication.)

*Dated 26th May.*

1288. A. Porecky—Umbrellas, &c.
1289. T. Singleton—Looms.
1291. G. Simpson—Weighing-machines.
1292. W. Racster—Central action buffers, and spring guides for traversing rods.
1293. C. Cowper—Iron manufacture. (A communication.)
1294. W. Warcup—Springs for carriages.
1295. A. R. Le Mire de Normandy—Regulating pressure of steam.
1296. J. Saunders—Railway and other wheel tyres.
1297. T. Westhorp—Oakum.
1298. W. J. Harvey—Fire-arms.
1299. J. Box—Supply of steam-boilers. (A communication.)
1300. W. Weatherly and W. Jordan—Stuffing-boxes.
1302. J. A. Roth—Machinery for treating fibres of flax, &c. (A communication.)

*Dated 27th May.*

1303. W. Henham—Ploughs.
1304. S. Shipley—Cases for shaving-soap, &c.
1305. C. Arnoux—Locomotives.
1307. J. L. Stevens—Furnaces.
1308. A. Keiller—Confections and comfits, known as "Pan goods."
1310. W. H. Bentley—Locks and keys.

*Dated 28th May.*

1311. J. Butterfield—Looms.
1315. R. A. Brooman—Abdominal supporters. (A communication.)
1316. C. Hill—Stays.
1317. F. Francillon—Dyeing and printing, &c.
1318. D. Bateman—Carding wool, &c., and manufacture of cards.

1319. C. Binks—Manufacture of chlorine, &c.
1320. W. W. Marston—Breach-loading fire-arms.
1323. A. W. Sanderson—Effervescing powders.

*Dated 30th May.*

1327. J. Macdonald—Lamps and lighthouse signals, &c.
1328. F. W. Wymer—Raising and lowering ships' boats.
1329. J. Bernard—Obtaining differential mechanical movements.
1331. J. C. Bothams—Condensing steam-engines.
1333. J. G. Appold—Screw propeller.

*Dated 31st May.*

1334. W. Brookes—Stoves and grates.
1335. W. F. Shoebridge—Drain-pipes.
1336. G. Goodlet—Engines worked by steam, air, or air and water combined.
1338. W. E. Newton—Hand-stamp. (A communication.)

*Dated 1st June.*

1339. J. Morris—Envelopes for needles.
1341. A. Hardwick—Propelling.
1342. T. Aitkin—Steam-boiler furnaces.
1345. M. Scott—Propelling.
1346. J. Stocks—Looms.

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APPLICATIONS WITH COMPLETE SPECIFICATIONS FILED.

1347. Earl of Dundonald—Apparatus for laying pipes, and juncture of same. June 1st, 1853.
1376. Lieut. J. J. Kerr—Cartridges. June 4th, 1853.
1400. T. Davis—Manufacture and piling of iron for railway chairs. June 7th, 1853.

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## WEEKLY LIST OF PATENTS SEALED.

*Sealed* 2nd *June*, 1853.

Year, 1852:
931. William Keld Whytehead, of 69, Cornhill—Improvements in steam-engines and steam-boilers.

*Sealed* 8th *June*, 1853.

Year, 1852:
995. John Harrison, Robert Harrison, and Alexander Stewart Harrison, of Dromore, Down, Ireland—Improvements in machinery used in the manufacture of textile and other fabrics.
998. Donald Beatson, of Mile-end, and Thomas Hill, of Southampton—Improvements in the means of propelling ships and other floating vessels.
1002. James Spotswood Wilson, of Tavistock-place—Improvements in propelling.
1009. William Allchin, of Globe Steam-engine Works, Northampton—Improvements in agricultural and other steam-engines.
1014. Thomas Masters, of Oxford-street—Improvements in machinery or apparatus for cleaning knives and other steel articles.

Year, 1853:
85. William Nairn, of South Inch Mill, Perth—Improvements in reeling yarns or threads.

*Sealed* 10th *June*, 1853.

Year, 1852:
1020. Richard Archibald Brooman, of 166, Fleet-street—Improvements in evaporating apparatus. (A communication.)
1033. Charles Ritchie, of Hackney—Improvements in apparatus for measuring fluids.
1067. Charles James Willis, of Clarendon-chambers, Hand-court, Holborn—Improvement in machinery for amalgamating, mixing, and grinding substances together.
1076. John Healey, of Bolton-le-Moors—Invention for the application of glass and enamel to the flyers and other parts of machinery used in the preparing, spinning, doubling, winding, warping, dressing, and weaving of cotton, wool, flax, silk, and other fibrous materials.
1140. John Moore Hyde, of 1, Quay, Bristol—Improvements in steam-engines, and the production of steam for the same.
1204. Julius Singer, of Mabledon-place, Burton-crescent—Improvements in wearing-apparel.
1211. James Lord, of the Inner Temple—Improvements in carriage-steps.

Year, 1853:
96. John Walker Wilkins, of Hampstead—Improvements in electric telegraphs, and in the instruments used in connection therewith.
145. Georges Edouard Gazagnaire, of Marseilles, and 16, Castle-street, Holborn—Improvements in the manufacture of nets for fishing and other purposes. (A communication.)
209. Casimir Noël, of Paris, and 16, Castle-street, Holborn—Invention of a new regulating bit.
238. Lewis Jennings, of Fludyer-street, Westminster—Invention of an improved construction of lock.

*Sealed* 11th *June*, 1853.

Year, 1852:
1028. Archibald White, of Great Missenden, Bucks—Improvements in apparatus for retarding and stopping railway trains.

*Sealed* 13th *June*, 1853.

Year, 1852:
1037. Joseph Hamblet and William Dean, of Oldbury, Worcester—Improvements in the manufacture of bricks.
1042. Jules Lejeune, of Auteuil, near Paris, and 16, Castle-street, Holborn—Invention of a new machine for washing house-linen, and all kinds of textile articles that are employed in making them.

*Sealed* 14th *June*, 1853.

Year, 1852:
1059. Joseph Paul Mare Floret, of Paris, and 16, Castle-street, Holborn—Invention of an improved method of producing simultaneously gas-light and lime or plaster.
1973. André Cointry, of Nantes, France, and 16, Castle-street, Holborn—Improvements in the manufacture of bread and biscuits.
1098. George Thomson, of Dalston—Invention of a machine for cutting wood.
1110. George Lingard, of Birmingham—Improvements in taps and apparatus connected therewith, for admitting air to beer and other liquors under draught.
1141. Alfred John Hobson, of Walsall—Invention of a new or improved metallic bedstead.
1143. Alexandre Deutesh, of Paris—Improvements in treating oil of Colza and other similar oils.

Year, 1853:
456. Edwin Stanley Brookes, Joseph Black, George Stevenson, and William Jones, of Loughborough—Improvements in machinery for the manufacture of looped fabrics.
763. Christopher Nickels, of York-road—Improvements in weaving narrow fabrics.
827. William Radford, of Buckingham-street, Lieut. R.N.—Improvements in the construction of metallic beams or bracings and metallic sheets or plates, applicable to the building of ships and other structures where lightness and strength are required.
857. Herbert Taylor, of Mark-lane—Improvements in ornamenting surfaces or fabrics, applicable to various useful purposes, such as for covers of furniture, imitation tapestry, carpets, or hangings. (A communication.)
874. Henry William Harman, of Northfleet Dockyard—Improvements in steam-engines.
883. John Smith, of Bartholomew-close—Improved mode of suspending carriage-bodies.
884. Alfred Vincent Newton, of 66, Chancery-lane—Improvements in steam-boilers, and in the mode of supplying the same with water. (A communication.)
389. Thomas Edwards, of Islington Foundry, Birmingham—Improvements in steam-engines.
929. William Walker Stephens, of Edinburgh—Invention of the application of retorts in gas-ovens or other ovens, and of gas-ovens or other ovens which are constructed as retorts, to the process of improving iron, and converting iron into steel.
962. Henry Carr, of East Retford—Improvements in the construction of railways.
996. Isaac Brentnall Sheath, of Birmingham—Improvements in fire-arms.
1017. George Critchley, of Cheltenham—Improved apparatus for regulating the heat and supply of water in hot water apparatus.
1026. William Frederick Thomas, of Porchester-terrace, Bayswater—Improvements in apparatus for sewing or stitching.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| June 10 | 3473 | "La Renommée" Shirt. | Peter Tait | Limerick, Ireland. |
| ,, 11 | 3474 | Oriental Silk Preserver, for Ladies' Work-Tables. | Henry Olden | Birmingham. |
| ,, ,, | 3475 | The Heat-conductor, for self-acting Ranges. | Frederick Edwards | 42, Poland-street, Oxford-st. |
| ,, 15 | 3476 | Improved Pressure Pump, applicable to be fitted on board Emigrant or other Ships, or any other situation where a Fire-engine may be required. | Alfred Sharland and James Gotley | Baldwin-street, Bristol. |

# SOCIETY OF ARTS.

**FRIDAY, JUNE 24th, 1853.**

## ADVERTISEMENT DUTY.

In reference to the amended Resolution proposed by the Chancellor of the Exchequer, alluded to in the last Number of the JOURNAL, page 367, the following important Petition has been prepared and signed for Presentation, by the leading Publishers and Booksellers.

*To the Honourable the House of Commons, in Parliament assembled.*

The Petition of the undersigned Booksellers, Music-sellers, and Publishers,

SHEWETH—

That your Petitioners have seen with great satisfaction, that your Honourable House has passed a Resolution, that the Advertisement Duty ought to be abolished.

That your Petitioners have seen with regret the proposal of the Chancellor of the Exchequer to retain a part of the Advertisement Duty.

That the remaining Advertisement Duty will be liable to all the gross inequalities of the old duty.

That the words in which the duty is to be re-imposed, will include literary works, which have hitherto been exempted.

Your Petitioners therefore pray, that if your Honourable House should think fit to reimpose the Advertisement Duty, it will omit from the Chancellor of the Exchequer's Resolutions the words, "or in or with any pamphlet or literary work."

And your Petitioners will ever pray, &c.

Longman, Brown, and Co.
Simpkin, Marshall, and Co.
John Murray.
Walton and Maberly.
Robert Baldwin.
Arthur Hall, Virtue, and Co.
Cradock and Co.
Piper Brothers and Co.
Francis and John Rivington.
Aylott and Co.
John W. Parker and Son.
Houlston and Stoneman.
John Van Voorst.
Groombridge and Sons.
Campbell, Hansford, and Co.
Trübser and Co.
Wertheim and Macintosh.
Partridge and Oakey.
Orr and Co.
W. H. Allen and Co.
Smith, Elder, and Co.
D. Bogue.
J. A. Novello.
Effingham Wilson.
W. Tegg and Co.
T. E. Purday.
J. Williams.
Jackson and Walford.
Charles Dolman.
Leader and Cock.
Grant and Griffith.
Sampson Low.
George Routledge and Co.
R. B. and G. Seeley.
W. Benning and Co.
John Chapman.
Henry Henshaw.
Reeve and Co.
Varty and Owen.
W. H. Dalton.
James Ridgway.
Edward Moxon.
Richard Mills.
Robert Cocks and Co.
G. Metzler.

## INDUSTRIAL INSTRUCTION.

THE publication of the Report of the Committee of the Council of the Society of Arts on Industrial Instruction, with the evidence on which that Report is founded, has been undertaken by the Messrs. Longman. It will be out on Monday.

## INTELLECTUAL AND PHYSICAL POSITION OF THE WORKING CLASSES IN THE DUCHY OF NASSAU.

BY THOMAS TWINING, JUN.

### 1.—*Primary Education.*

IN the Duchy of Nassau, as well as in other parts of Germany, the education of the industrial classes is provided for by a complete system of elementary schools, extending to the smallest village, under the direction of Government. All children from six to fourteen years of age are obliged to attend these schools, unless they frequent some other institution. No child is allowed to remain without instruction.

The time of attendance is short for children of early age, but is gradually increased to the following scale, with a few deviations in country districts; namely, in the morning from seven to ten in summer; and from eight to eleven in winter; and in the afternoon from one to four, except Wednesdays and Saturdays, which are kept as half holidays. The names of children failing to attend are noted down, and their parents subjected by the Burgomaster to a fine, which is increased on recurrence of neglect.

The children learn very quickly to read by a kind of Phonetic system.—In what is called *Auschanung's Unterricht*, the sense of vision is used in a variety of ways for assisting the memory and facilitating the expansion of the intellect.

On leaving school at fourteen years of age, the scholar must be able to read German in German and Roman type, fluently, and with proper emphasis and expression; must be skilled in the rules of common arithmetic; be able to write compositions on subjects of business, with good orthography; and be possessed of some knowledge of geography, natural history, geometry, &c., &c.

The charge to the parents for this instruction is from one to four florins* per year for each child, which amount is paid into the treasury of the parish. The latter provides, under control of Government, for the salary of the master, as well as for school requisites of every kind, and also for the building of the school-houses. Poor communities receive subsidies from the Government treasury.

There are two seminaries, or primary schools, for the education of schoolmasters—one Evangelical, one Roman Catholic—in which young men from sixteen years of age and upwards, receive, at the expense of the Government, a thorough general and special education, including music. At the expiration of three years they have to pass an examination; after which they are appointed school-assistants, with a salary of about 150 florins, which, after two years, is somewhat increased. After another year or two, they are installed as schoolmasters *(Lehrer)*, with a salary of 200 florins. Their subsequent promotion, and consequent increase of salary, which reaches up to about 700 florins, takes place according to seniority. I believe that the Government Board of Education, called *Schul Colleg*, to which the direction of the whole educational system is intrusted, is quite at liberty to take talent and meritorious exertions into due consideration, especially in the kind of promotion which takes place by the transferment of a master from one locality to another; but that there is at present, in consequence of the events of 1848, rather a tendency to keep down rising energies, which might perchance take a turn towards liberalism.

Though the rate of emoluments is unquestionably too low, yet at the same time it must be borne in mind that the necessaries of life are much cheaper in this country than in England, and the general mode of living simpler and more frugal. In country places the teachers have many little compensating advantages, which I need not detail, but with all, the great consideration is, that being Government servants they may look forward to promotion; and that, at all events, their livelihood is guaranteed by a regular system of pensioning. A teacher in Germany prefers an appointment of 400 florins at a Government school, to a salary of 800 florins at a private school.

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* The Nassau gulden or florin may be reckoned as equal to 1s. 8d., and twelve florins to 1l.

Schoolmasters in country districts are generally trustees of small public libraries, superintend nurseries of fruit and other trees, in the cultivation of which they instruct the boys; are the leaders of singing societies, and almost always organists of the parish churches; an arrangement which is found as convenient as it is economical.

In connection with each school, girls are taught appropriate handiwork, every Wednesday and Saturday afternoon, by the wife of the teacher, or some other competent person. Females are, however, seldom or never employed for *intellectual* instruction in the elementary schools.

One of the most interesting features in the educational system of this country is, the peculiar smoothness with which it slips over an obstacle deemed almost insurmountable in England, viz., the diversity of religious persuasions.

The population of Nassau consists of Protestants and Roman Catholics, in the proportion of about three of the former to two of the latter. There are also a few German Catholics and Jews. Some districts contain only Protestants, others only Catholics. In many places they are mingled together in various proportions, always enjoying equal rights. In purely evangelical parishes, evangelical teachers are appointed; in purely Roman Catholic places, Roman Catholics; in places of a mixed population, both; or if the place is small, the preponderating number decides the question. "A long experience," says a respectable person, to whom I owe much information on these subjects, "has proved the practicability of a just poising of interests under circumstances apparently most difficult. If people see that you proceed with a conscientious endeavour to act with impartiality and justice they are readily satisfied."

The same plan of equable and friendly adjustment extends throughout the whole system. Thus the *Schul Colleg*, or Education Committee mentioned above, is composed of three Protestants and two Catholics.

The above educational organization was introduced in 1817. Elementary schools were previously in existence, but entirely dependent upon the parochial authorities, who hired, as they would the herdsmen of the place, a man who could just read, write, and do a little ciphering, and to him the school was entrusted. The result may easily be imagined. The teacher was obliged to accommodate himself to the exigencies of the country people, and kept no school in summer. The scholars on leaving school could hardly read, write, or cipher; and the attainment of other useful knowledge was out of the question. This however applies more especially to the country; in towns the plan was already much better, and more regular.

In 1817 the Government took the matter in hand; and from that time education prospered in the hearts as well as in the minds of the people, because it was conducted on a plan adapted to the exigencies of the age, conformable to the regularly centralized administrative system of the country, and in unison with the mild and tolerant spirit of its religion. There are, indeed, a few defects to remedy,—but they are less intrinsic in the system, than attributable to the manner in which it is administered; and on the whole, the success is so satisfactory that one cannot feel surprised at the very decided opinion which prevails here, that an educational system, directed and supported by the State, is the only one which can effectually drill the mass of a population into intellectual discipline.

## THE ARTIFICIAL MEMBRANA TYMPANI.

BY JOSEPH TOYNBEE, F.R.S.

In a paper recently read before the Royal Society, entitled, "On the Muscles which open the Eustachian Tube;" I have endeavoured to show that, contrary to the usually received opinion, the tympanum is a closed cavity, and that the air within it communicates with that in the cavity of the fauces *only* during the momentary act of swallowing. The muscles which open the Eustachian tubes in man, are the tensor and elevator palati. To prove that the cavity of the tympanum does not constantly communicate with that of the fauces, but that it forms a shut cavity by the closed condition of the Eustachian tubes, the following simple experiment may be performed. If the mouth and nose be closed during the act of swallowing the saliva, a sensation of fulness or distension is experienced in the ears; this sensation is produced by the air, which is slightly compressed in the fauces, passing into and distending the tympanic cavities. Upon removing the hand from the nose, it will be observed that this feeling of pressure in the ears does not disappear, but it remains until the act of deglutition is again performed, while the nose is not closed. In this experiment the Eustachian tubes were opened during each act of deglutition: during the first act, while they were open, air was forced into the cavity of the tympanum by the contraction of the muscles of the fauces and pharynx; and the guttural orifices of the tubes remained closed, until the second act of swallowing, which opened the tubes and allowed the air to escape. That the tubes are open only during the act of swallowing is also shown by the fact that the means usually adopted during the descent in the diving-bell to prevent the extremely unpleasant sensation of pressure in the ears, is to perform frequently the act of deglutition.

The conclusion at which I have arrived respecting the influence of the closed Eustachian tubes is, that for the function of hearing to be perfect, it is requisite that the tympanum should be a shut cavity, and that the analogy usually cited as existing between the ordinary musical instrument, the drum, and the tympanum, to the effect that in each it is requisite for the air within to communicate freely with the air without, is not correct. On the contrary, no *displacement* of the air is requisite for the propagation of sonorous undulations; and that were the Eustachian tubes constantly open, the undulations would extend into the cavity of the fauces, there to be absorbed by the thick and soft mucous membrane, instead of being confined to the tympanic cavity (the walls of which are so peculiarly well adapted to the production of resonance), in order that they shall be concentrated upon the labyrinth.

Having therefore determined the fact that the tympanum in its natural state is a closed resonant cavity, it occurred to me that the deafness associated with the partial or entire loss of the membrana tympani, was dependent upon the circumstance that the sonorous undulations were no longer confined to the tympanum, but were allowed to escape into, and be expended in the meatus; it consequently suggested itself to me, that the function of hearing might be restored by again rendering the tympanum a closed cavity. I therefore resorted to the use of an artificial membrana tympani, composed of vulcanized India-rubber, in extremely delicate laminæ, or of very thin layers of gutta percha, and this apparatus has fully answered my expectations; by its means I have been enabled in the course of the last six months to improve the power of hearing in between thirty and forty patients, so that many have heard perfectly well, and others have no longer been excluded from the advantage of hearing general conversation. One of these patients was shown before the members of the Pathological Society of London; and I subjoin the printed Report of the meeting:

"The artificial membrana tympani, of which specimens are now placed before the Society of Arts, consists, as has already been stated, of a very thin layer of vulcanized India-rubber, or gutta percha. This is placed between two very delicate silver rings, from the eighth to the sixth of an inch in diameter, which are riveted together, leaving a portion of the membrane drawn tense in the interior of the circle, and a portion is left beyond their circumference, so as to prevent the latter from being in contact with the surface of the tube of the ear. To the surface of one of these rings a very delicate silver wire about an inch long, is fixed by two branches, and by the stem thus formed, the membrane can be introduced and removed at pleasure. The circular rings are so fixed to the wire, that the outer surface looks obliquely outwards and forwards instead of directly outwards; thus imitating the direction of the natural membrana tympani. The artificial membrana tympani is also made by placing the layer of membrane between two circular plates of silver, about a line in diameter; this is applicable to cases where the tube is so narrowed that the ring cannot pass. The membrane is made larger than it can be required for use, so that the surgeon can cut it down to the desired shape and size. The artificial membrane can be introduced and removed by the patient without any difficulty; for the latter purpose a pair of forceps may be used."

## PORTABLE CAMERA.

BY GEORGE EDWARDS.

THE experience of many years enables me to propose some improvements in the mechanical arrangements of the Camera Obscura, which, to say the least, will not offend any of the laws of the sister sciences.

The novel construction of my camera ensures a very great reduction in bulk and weight, rendering it peculiarly convenient for tourists, whilst it nevertheless is efficiently rigid and stable in use, the parallelism of the lens and receiving surface being perfectly preserved, with means of preventing such motion as has hitherto existed in portable cameras, and which *must be* fatal to perfect definition in windy weather.

The framework of my camera is entirely of metal, the covering or sides being of "cording," or any other sufficiently opaque and flexible material. The colour of this covering would be better white than black, especially for the use of collodion. The impossibility at present of procuring it only prevented its use.

The top of my stand is furnished with a ball and socket joint, with a screw on the top. To this is screwed by its centre a light brass tube, equalling the total length of the apparatus, and forming its foundation. At right angles to one end of this is secured (when required) a frame of sheet brass, of a size and form to receive the "plate box," to slide into it. On the other end is a slide which may be cramped in any position; to this is attached the lens end of the camera,—this, however, is only large enough to receive the lens, — four wires connect the four corners of the large end with the four corners of the small end, their ends being secured to the former by spring catches; their other ends pass freely through holes provided for that purpose in the small end, a distance sufficient for any adjustment of focus.

The skeleton or outline thus formed (that of a truncated pyramid) is covered with the material above described. The focus being adjusted, the two upper wires are securely clamped by screws provided for that purpose, so that no shade whatever can exist between the picture and lens,—an essential requisite for good definition.

The advance of the lens is a diaphragm of metal, supported by a folding bracket, the shading tube of which is also of silk "cording," and which, when packed up, folds over the lens.

To reduce the camera to its smallest dimensions, the wires are taken out and packed inside the tube; the small end of the camera then folds with the covering into the larger end, when the following figures give correctly the results:

The *area of the picture* obtained is 76 *per cent.* of the *area of the largest end* of the Camera.

The total *bulk* (with the looking-glass and tube) is only 4 *cubic inches per square inch of the picture.*

The total *weight* (without the looking-glass) is only 1¼ *oz. per square inch of the picture.*

I believe I may with confidence challenge competition in these important requisites, and doubt whether they have ever before been approached. These results are, however, obtained in what may be called a *small* camera, with an area of picture of only 38¼ square inches; in larger cameras, for which this arrangement is pre-eminently adapted, these results would evidently be still more advantageous. Neither is there any nicety of workmanship required, which renders the construction expensive or repair difficult; a very simple modification would permit the lens to be placed excentrically with the picture.

Two short legs screwed into the lower part of the brass frame (when required) would enable this camera to stand upon an ordinary tube, if necessary; and a short right-angled junction will permit the camera to be placed with the longest diameter vertical for tall objects.

A looking-glass for reflecting the view, and placing it *erect*, admits a reduction in the length of the legs, whilst a very small curtain keeps off all interfering light.

The present plate-box is adapted for glass or silvered plate; it is scarcely necessary to say that a simpler modification would adapt the same space for the reception of one or more papers.

It is easy to understand that a box sufficiently large to be used as a workshop out of doors (as Mr. Archer uses his camera) may be constructed on similar portable principles. Into this my camera would pack, with the rest of the required materials; and which is, I think, a better arrangement than combining the two.

GEORGE EDWARDS.

## EAST ANGLIAN UNION.

**The following Circular has recently been drawn up and circulated by the President of the Romford Literary and Mechanics' Institution, amongst the Institutions in the Eastern Counties:**

SIR,—The great success that has attended the Union of Institutions in Yorkshire, in Lancashire, and in the West of England, has induced me, as President and Representative of an Institution, to propose the establishment of a similar Union among the Institutions in the Eastern Counties, under the title of "The East Anglian Union of Literary and Mechanics' Institutions."

The advantages to be derived from such a movement, may be briefly stated:

1.—The establishment of a Committee of those most interested and most experienced in their management, to confer upon measures best calculated to increase the usefulness, and to advance the interests of the Institutions; such Committee to be ready at all times, when desired, to afford advice, to revise rules, and to aid in promoting new Institutions.

2.—The publication of an Annual Report, embracing the principal features and experience of the Institutions in Union; thus aiding, by the collection of statistics and interchange of information, to promote their more efficient working, and to increase their numbers.

3.—To afford facilities for obtaining Lectures, by recording the names of those Gentlemen, in each locality, able and willing to lecture gratuitously; by the formation of a library of Manuscript Lectures and Collection of Diagrams, &c. for loan; and by arranging the circuits of efficient professional Lecturers.

4.—To secure the services of an Agent or Lecturer to visit the Institutions, to attend their Annual Meetings, Soirées, &c., to advise in difficult circumstances, to suggest improvements, &c.

5.—To hold an Annual Meeting of Delegates, such meeting to be convened in a different locality each year. Thus exciting a spirit of sympathy, and arousing emulation on behalf of the Institutions in varied districts.

Many other incidental advantages must accrue from such a combination, working as a wheel within a wheel, not interfering with, but promoting the object of the Union of all the Institutions under the Society of Arts.

The expenses of the general management might be met by a Subscription from the Institutions. The Yorkshire Union of 123 Institutions, has adopted the following scale:—Institutions having less than 70 Members, 5*s.* per annum; above 70 and less than 150, 10*s.* per annum; and 150 and upwards, 1*l.* per annum. The special object of a paid Agent or Lecturer, is met principally by the Subscriptions of the Nobility, Gentry, and those interested in the District to be benefited; and surely the East Anglian District would not be behind in supporting a movement so calculated to promote the moral and intellectual progress of the people, and so characteristic of the age.

This communication will be considered as merely suggestive; farther detail with arrangements, must be left until the replies from Institutions prove whether such a measure would be likely to meet with general approval.

May I, therefore, respectfully request you to submit this Letter to the consideration of your Committee.

I am, Sir, yours very obediently,
W. TAYLOR JONES, M.A.,
*President and Representative of the Romford, Literary and Mechanics' Institution.*

ROMFORD,
*June* 20, 1853.

## TEACHING MUSIC TO THE BLIND.

BY WILLIAM WOOD, OF THE SCHOOL FOR THE BLIND, ST. JOHN'S WOOD.

THE deep-rooted attachment of the blind to music has always been proverbial, arising probably from the acuteness of their sense of hearing, which enables them to appreciate the most delicate musical sounds, and partly perhaps, from its suitability to their peculiarly isolated condition. Music has therefore become one of their principal sources of pleasure and employment; and anything which is calculated to be of service to them in this respect, is of paramount importance to them.

It is very commonly supposed that the blind learn their music, technically speaking, "by ear." This, however, is not often the case, at least not in the common acceptation of the term. The blind generally play or sing as much from musical notation as those who see; the only difference being, that seeing persons have the music visibly before them, while the blind have it carefully stored up in their memory, and see it only with their mind's eye. The principal inconvenience to the blind is their dependence upon the seeing, through whom all their music must be received, and by whose assistance their memories must from time to time be refreshed. This inconvenience produces in the blind a love of originality which is very prejudicial to their interests.

Many attempts have been made in America, on the Continent, and in England, to provide tangible music for the blind; its success, however, has been very limited. To be of any real use to them, it must be capable of being deciphered with the greatest facility. In most of these attempts the common system of notation has been adhered to. But here much difficulty is presented to the touch, although this sense is so strongly developed in the blind. The shapes of the notes are very complicated to the touch, and their position on the stave very difficult to feel. From the breadth of the stave, which must be increased to render the notes at all perceptible, it becomes very easy for the finger, as it proceeds, to pass many of the numerous musical directions, which may be above or below the stave,—such as slurs, pauses, pianos, &c., &c., without feeling them at all; and the omission of any one of these musical signs, as well as others occurring within the stave, such as rests, dots, sharps, &c., &c., would be very detrimental to the music,—much more so than the omission of a letter in the embossed reading. I may add, that in reading music, the context is of very little assistance in deciphering a character. Under these circumstances, it is not surprising that so little success has attended the effort to produce a musical literature for the blind. As long since as 1844, I entertained the opinion that music expressed by arbitrary characters would possess many advantages, and immediately matured a plan of this kind, which was referred to in the Report of the London Society for teaching the Blind to Read, in the year 1845, of whose schools I am the Master. Within the last twelve months my plans have been carried out to some extent by the above-mentioned Society, and a collection of embossed psalm and hymn tunes, arranged for four voices, is in course of publication. The result is most satisfactory. The blind at our Institution read the music, and are enabled to sing by the *touch* with as much facility as seeing musicians sing *at sight*.

In adapting short-hand characters to musical notation, some advantage is gained by employing the characters of some one embossed system of reading already in existence, in preference to inventing new characters, for then no new type is required, and very much expense and inconvenience is saved.

Lucas's system which has been in use at this Institution from its commencement, is generally considered to be one of the most successful; and it possesses the singular advantage of being easily adapted to the purposes of Music. As it is well known that all blind persons can feel Lucas's characters, no proof is required that my embossed music, which is raised by means of the very same type, can be easily felt. The blind have been employed for some time past at our Institution, under my supervision, in arranging the types for embossing, and performing in fact all the work necessary for the production of the embossed books. The volume accompanying this paper, containing forty-seven psalm tunes, is the work of the blind. I am not aware that the blind are employed, to any extent, in producing embossed books upon any other system, which is an additional inducement for adopting Lucas's. But there is another advantage in these characters; namely, that the blind can not only read them, but can also easily emboss them without the aid of a printing press. This is done by means of a simple apparatus which I had the honour of submitting to your notice in the year 1847. Its object was to enable the blind to emboss Lucas's characters, and thus communicate with each other, keep accounts, and make memoranda. Having now adapted these characters to music, and made some other little improvements in this apparatus, its value is considerably augmented. For these reasons I have chosen Lucas's characters for my musical notation.

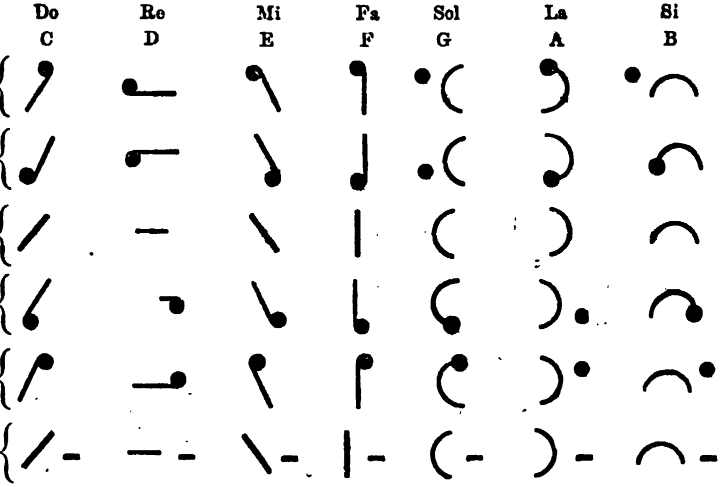
Other arbitrary embossed systems have been adapted to music, and can probably be easily felt, but they have the disadvantage of taking up much more room than mine; it having been thought requisite to have two characters to represent a note, one for the *sound*, and the other for the *time*, in most of these plans. It is not so in the plan I am about to submit to you.

All the raised characters in Lucas's system, used under ordinary circumstances for letters and figures, are employed by me to represent notes and other musical signs, so that the blind are enabled to read and emboss their own music with facility.

The direction of the character used for the note shows what sound it represents. Thus:

A line declining to the left is C, or Do.
A line from left to right is D, or Re.
A line declining to the right is E, or Mi.
An upright line is F, or Fa.
A bow with the convex to the left is G, or Sol.
A bow with the convex to the right is A, or La.
A bow with the convex upwards is B, or Si.

The Time of the note is determined by the position of the dot on the character. Thus:



Semibreves have a dot at the left at the top. Thus:

Minims have a dot at the left at the bottom. Thus:

Crochets have no dot, and are represented thus:

Quavers have a dot at the right at the bottom. Thus:

Semiquavers have a dot at the right at the top. Thus:

Demisemiquavers have the hyphen to the right. Thus:

Both the sound and duration of each note being shown by one character, the stave of five lines used in the common system of notation is dispensed with, and the music is brought into one line, like the common reading.

In the Tenor and Treble lines notes above "E" the fourth space have the | placed before them, and notes below "F" the first space are preceded by —. In the Alto and Bass lines notes above "G" have the | before them, and those notes below "A" are preceded by —. (See Figures 1 and 2.)

The | when placed after a note lengthens its duration one half. (See Figure 3.)

Notes between ● and ● are slurred or tied. (See Figures 4 and 5.)

Fig. 1.

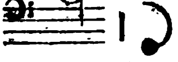


Fig. 2.

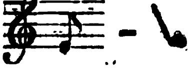


Fig. 3.

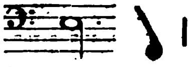


Fig. 4.

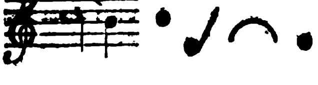
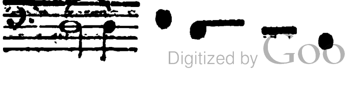
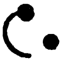
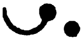
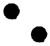
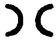
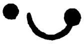
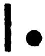
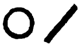
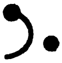
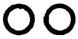
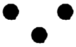
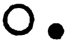
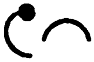
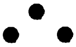
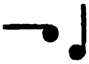
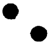
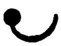
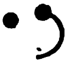
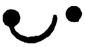
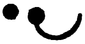
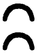
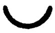
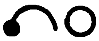
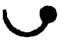


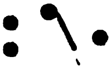
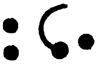
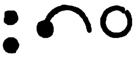
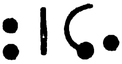
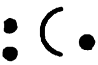
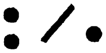
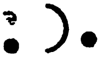
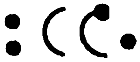
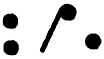
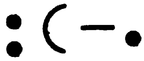
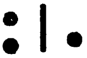
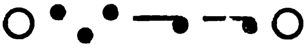
Fig. 5.



**The following are some of the signs employed:**

| | | | | | |
|---|---|---|---|---|---|
|  | (C.) Canto or Treble. | | Flat. |  | Pianissimo. |
|  | (A.) Alto. |  | Natural. |  | Mezzo Piano. |
|  | (T.) Tenor. | | Bar. |  | (Or.) Organ. |
|  | (B.) Bass. |  | Double Bar. | | (F.) Foot or Pedal. |
|  | Semibreve Rest. |  | Finis. |  | (Cm.) Common Time. |
|  | Minim Rest. | | (S.) Solo. |  | (2.4.) Two-Four Time. |
|  | Crochet Rest.. |  | Forte. |  | Alla Breve Time. |
| | Quaver Rest. |  | Fortissimo. | | Staccato. |
| | Semiquaver Rest. |  | Mezzo Forte. |  | More Staccato. |
| | Demisemiquaver Rest. |  | Pause. |  | (Cho.) Chorus. |
| | Sharp. |  | Piano. | | |

When any of the above signs or other musical directions are liable to be mistaken for notes, they are preceded by and followed by ● . Thus:

| | | | |
|---|---|---|---|
|  | (V.) Voice. |  | (Sh.) Shake. |
|  | Chorus. |  | Turned Shake. |
|  | (D.) Diminuendo. |  | Repeat from the sign |
|  | Crescendo. |  | (D. C.) Da Capo. |
|  | Rallentando. |  | (D. S.) Dal Segno. |
|  | (T.) Turn. |  | 22 Bars Rest. |

Notes forming chords are generally preceded by and followed by ● .

Psalmody and other similar music is divided into the several voice parts, and arranged one above the other. Each singer then feels that particular line suitable to his or her voice, and is enabled to sing by the touch with as much facility as seeing persons sing by sight. Organists feel all the parts, noticing that those notes which are struck together are placed exactly under each other. The blind find it a great advantage to learn their own music without the aid of a seeing person, and to be able to refer to it at any time. It not only increases their stock of music, but enables them to play with greater precision, and assists them materially in studying the science of harmony.

The object of my embossing apparatus is to enable the blind to make memoranda for their own use, to correspond with other blind persons, to keep accounts, and to emboss music in Lucas's characters. It consists of a desk, cushioned at the top, upon which the paper is secured. A bar extends across, and fits into holes on the sides of the desk. On this bar is a piece of brass, with an opening in it, called the slide, capable of being moved from right to left, and indicating precisely, by means of a rack, the distance it is moved. The characters are raised upon the ends of ten stamps, combined in a convenient form. By pressing any one of these moderately on the paper, through the opening in the slide, the character will be raised upon the reversed side of the paper, and can be easily felt. These ten stamps, by being used in different positions, will emboss the whole of Lucas's characters, which represent both letters and figures. The opening in the slide has eight corners; so that any one of the stamps can be inserted in eight different positions, and must be correctly formed. The lines are kept equi-distant by the bar, which is moved down the board, one hole at a time.

## HOME CORRESPONDENCE.

### LOCKS.

Sir,—As the recognition of merit, and the encouragement of improved manufactures and inventions by a body like the Society of Arts is a matter which ought to be as far removed from suspicion of any *gross error* as the fallibility of human judgment will admit, it will not be considered intrusive perhaps if I submit the following case to your judgment.

On the 1st of November, 1852, the Society issued their usual circular containing an offer of premiums for various articles, and amongst others (No. 83) "For the invention of a good and cheap lock, combining strength and great security from fraudulent attempts; cheapness, freedom from disarrangement by dirt, and requiring only a small key."

Being engaged in the manufacture of locks I considered the subject with some attention, but perceiving that the conditions were not perfectly consistent with each other I gave up all hopes of obtaining the prize, and looked forward with more curiosity than anxiety for the new productions of lock-making ingenuity that might be called forth by the liberal offer of the Society of Arts. At length your Journal of the 11th instant informed me that the medal of the Society, and a premium of 10*l*. had been awarded to Mr. Saxby, of Sheerness, for a lock that answered all the requisitions. On calling at the Society's rooms to inspect this piece of mechanism, I was surprised to discover that it was constructed on precisely the same principle as the "Yale Lock," described in a paper read before the Society in January 1852, and of the same construction as locks manufactured and sold by Mr. Cotterill of Birmingham; in short, that it had no claim whatever to be regarded as a new invention by the Committee of the Society, however honestly it might have been submitted as one by the maker. The want of originality in the lock, *supposing that it answered all the conditions* named in the circular, might have been passed over as a venial offence. This unhappily was not the case. That the essential requisite of security—"great security," as it is expressed in the circular,—did not belong to it, was proved by a very simple experiment. To be brief, *I picked this prize lock in the presence of parties connected with the Society, in the short space of three minutes!*

I do not mean to insinuate that there is any general carelessness in the selection of parties to determine the merits of competitors; or in their competency to form an opinion upon the worth and utility of the articles submitted to them. It is simply with the Committee on Locks, and with this particular case, that I have to deal; and it must be self-evident from the above statement, that they have betrayed their incapacity in the most flagrant manner. The case is still more surprising, when I observe that Mr. Chubb, of St. Paul's Churchyard, was a member of the Committee by which this award was made. This singular fact exonerates the Society indeed from much blame, for it cannot be surprising that a Committee of which a gentleman of Mr. Chubb's repute, as a mechanic in that particular branch of art, was a member, should be implicitly trusted.

79, Cheapside, Respectfully yours,
*June 21st*, 1853. A. C. Hobbs.

### CHRONOMETERS.

Sir,—I observe in the last Number of the Journal, that Mr. Denison repeats the statements concerning the chronometer trials which he made after the reading of my paper.

The only ground he has for making these statements is founded on the rule which he framed and substituted for the one employed at the observatory.

This rule, as a method of ascertaining the merit of the different modes of secondary compensation, I have already shown by example has no foundation in truth.

It is therefore unnecessary that I should add many observations to those already published, or reply to the details of Mr. Denison's letter; but as some of his remarks are calculated to mislead, I will notice one or two portions.

In the first place, there is no report from the Astronomer Royal to the Board of Admiralty, that I am aware of, which states that any other method of secondary compensation has succeeded equally with mine; nor indeed any report, since one on the plans of Eiffe and Molyneux, in 1842, stating that any of the other methods had succeeded, on trial, at the Observatory at all.

In the second place, I have no complaint against the Exhibition Jury as a body; for Baron Seguier and Professor Colladon have both written to me, and expressed their regret that the Council medal which they recommended should be awarded for my improvements in horology was not passed, owing to the opposition of Mr. Denison, who being the Chairman, was the only person in the class entitled to vote.

For the same reason, the recommendation of the foreign jurors to award a similar medal to Mr. Charles Frodsham, the present representative of the eminent house of Arnold, was not carried out.

I am more desirous to record these exertions of the foreign jurors to obtain justice for English exhibitors, because a report was circulated at the time that the French Jurors were using every effort to secure the principle honours for their own countrymen.

The following were the gentlemen that composed the Jury on horology:

Baron Armand Seguier, Member of Institute, &c., France.

Professor Colladon, Switzerland.

E. B. Denison, Barrister, Chairman and Reporter.

E. J. Lawrence, Barrister.

Yours, &c.,
London, 21st June. E. T. Loseby.

## INDIAN TELEGRAPHIC SYSTEM.

Adelphi, 20th June, 1853.

SIR,—In the Extracts from Dr. O'Shaughnessy's Treatise on the Electric Telegraph in India, printed in the last Number of the Society of Arts' Journal, it is stated that when the Doctor had completed his experiments (commenced in 1839) in the Botanic Gardens of Calcutta, the results were published, and the line taken down; yet, although by these valuable experiments, it was ascertained that signals *could be transmitted* by electrical agency to a distance of twenty-one miles, the experimenter discovered that if the electric telegraph should ever be introduced for practical purposes into India, it must be effected by some more secure and certain way of protecting the line wires than by hanging them (as in the case of the experiments) on bamboos, exposed to hurricanes, atmospheric influences, and destruction by monkeys, &c.; and thus the subject remained in abeyance until 1849, when I submitted my plan for effecting this important object, in the first place to Sir Archibald Galloway, then Chairman of the East India Company, who took considerable interest in the matter; and afterwards in the form of an official letter or report to the Secretary, a copy of which I also sent to each of the Directors. This letter was accompanied by a summary view of the reasons for, and advantages of, a telegraphic system in India, very carefully drawn up by Mr. Hyde Clarke; the whole being illustrated by large maps of India, showing the proposed lines of telegraphic communication.

Shortly afterwards, I invited the Chairman and Directors to an "exposition" of my system, which was attended by some of the Directors. Samples of gutta percha covered copper wire, and of gutta percha, poisoned to resist the attacks of the white ant, &c., furnished by myself, were transmitted to Lord Dalhousie.

Lieut.-Col. Forbes and Dr. O'Shaughnessy reported at great length on my system, &c.; the latter gentleman distinctly pointing out the impossibility of using wires suspended between poles, &c., and approving generally of the underground system, though disapproving of gutta percha, as he considered it could not be used in the climate of India; yet, curiously enough, I observe that he has since ordered 700 miles of gutta percha covered wire.

From the above, Sir, you will at once perceive the reason for transmitting "A Despatch (in 1850), from the Court of Directors to the Government of India."

The following paragraphs from my letter to the Directors of the 5th July, 1849, may not be uninteresting in an historical point of view at the present time.

"On looking at the accompanying map, it will be seen that the lines for telegraphic communication (coloured blue), which it would appear desirable to establish in the first instance, are—1st. Between Calcutta, Agra, Delhi, and Simla. 2nd. Between Calcutta and Bombay, *viâ* Mirzapore, Rewah, and Nagpore; and 3rd. Between Bombay and Madras, *viâ* Hyderabad. In Great Britain and Ireland there are at present more than 2,000 miles of railway without the electric telegraph, and the cause of this is chiefly owing to the great cost which has hitherto attended their construction. It may be stated, in round numbers, that the average cost of the lines of telegraph already established in Great Britain has not been less than from 150*l.* to 200*l.* per mile; whereas, in America, the average cost has not exceeded one-third of the former rate."

"At the present time, however, I am in a position to lay down telegraphs at a charge nearer to that of the American system, yet withal by a plan less objectionable. The exposure of wires suspended on perishable wooden posts, as practised in England, America, France, and other parts of Europe, is very objectionable on many accounts; more especially—1st, from effects of rain and fogs in diverting the electric fluid from its proper course. 2nd, From the injuries done to the posts and wires generally, and from the temptation which such exposure affords to malicious persons to cut off the communication altogether, or to alter the course of the electric current; all which have frequently taken place; not to mention the necessity of periodically reinstating the wooden posts at considerable expense. A notion is very prevalent that telegraphs cannot be established without the protection of railways. This is certainly true as regards the system at present adopted in Great Britain, but does not apply to that which I am now advocating, as the wires, instead of being suspended above ground, are *safely deposited at a proper depth below the surface of turnpike and other roads, towing and footpaths, &c.*"

"From the above it will appear that the English system is not in any way applicable to India. It is clear that on many other accounts, besides those mentioned as objections to the system at present adopted in this country, telegraphs on the English system could not be established in India without the protection of Railways."

"I now come to the telegraphic system proposed for India, which may be characterised as simple, effectual, and economical. A copper wire, coated with *gutta percha* (which is remarkable for its insulating properties), is laid at a sufficient depth below the surface of the roads, and extending between the various points to be included in the circuit; at either terminus, and at the intermediate stations, the wire is connected with the telegraphic instrument, and at suitable distances an earth battery is provided, with which the terminal instruments are also connected; thus a second line wire, which was formerly used (merely to complete the circuit), is dispensed with, as the earth (being, as it is said, a vast reservoir of electricity) completes the circuit."

"The line from Calcutta to Delhi would seem to present the most favourable opportunity of commencing the Indian telegraph system, as a fine road extends from the former to the latter place, with bridges over all the streams. In the other lines laid down it might be necessary occasionally to cross rivers; for this I am provided with a subaqueous electro conductor, consisting of the wire (or wires), coated with gutta percha (already described), and *braided* or *served* with yarn, properly saturated with tar, and coated externally with marine glue, which is extensively used in the construction of timber-built ships sailing to all parts of the globe. Many other modes may be adopted for crossing rivers; but even in the case of a river presenting a complete barrier to the wire being deposited in its bed, telegraphic communication may be formed without any wire at all, and which plan is carried into effect in America; and in this country experiments have been successfully made to show the practicability of it."

"The Honourable Chairman, during the interview already mentioned, suggested a difficulty with regard to the gutta percha being attacked by the white ant; but I am enabled to say that Mr. Thom, a practical chemist, confidently states that bichloride of mercury (corrosive sublimate) being incorporated with the gutta percha, would present a complete barrier to the attack of the white ant, or other insects; as, by combining with the albumen in the organic tissues of the digestive organs of the insect, it would entirely destroy life. Again; arsenious acid, and other mineral poisons, might be used for the same purpose. Realgar (sulphuret of arsenic), for instance, may be mentioned as one such antidote; or organic poisonous principles may be combined with the gutta percha, so as entirely to repel the insect tribes by their smell."

Yours faithfully,
FRANCIS WHISHAW, C.E.

## LECTURES.

SIR,—It was the prevailing sentiment at the Conference on the 9th inst., that three difficulties lay in the way of the Society of Arts affording aid to Provincial Institutions with respect to Lectures. 1st. Institutions complain that when they engage new Lecturers they incur the risk of frequent disappointment as to ability and qualification, which they have seldom the means of ascertaining beforehand. 2ndly. It is said that the majority of Institutions are unable adequately to remunerate Lecturers of such a class as are likely to give satisfaction. 3rdly. That it is extremely difficult to get localised Institutions to unite in engaging the same Lecturer at the same time, although an engagement were intended by each. Would not the Society of Arts be doing much to remove the first difficulty, and be efficiently serving a number of deserving Institutions, by publishing a list of Lecturers of known talent and ability, who might be willing to render such services? I would not limit this to Lecturers of the first class, and requiring first class fees; but descend to those (and I imagine there are many) whom a fee of two to four guineas per Lecture would satisfy,—if five Lectures per week could be arranged at convenient distances. Generally it would be unreasonable to expect as good a Lecture for two guineas as when four were paid; but as the majority of Institutions can only afford the modest fee, I desire to see those helped who really require and deserve it most.

The removal of the second and third difficulties must rest chiefly with the Institutions themselves, by providing more ample Lecture funds, or by making their present means go further. To solicit for the best gratuitous Lectures which the resident talent can supply, and particularly from out their own members, is important; and in the engagement of paid Lecturers, to consult neighbouring Institutions with intent to engage, if possible, the same Lecturer in the same week. I regret to know that with most Institutions there is not only no disposition to do this, but a very decided one not to do it. Local Secretaries are constantly complaining to me that their brother Secretaries frequently decline to answer such letters, although by this plan each might often reduce the cost of Lectures one-third or more. Any six or twelve Institutions, within a moderate distance, thus united, might be independent of the world in their Lecture arrangements. I have seen it done with great success. The chief difficulties are the following, but all may be more or less overcome. Take, for example, a small county, with twelve Institutions,—granted the desire to form a little Lecture Union; as soon as they get into harness, they find that one makes its Lecture list in June, another in July or September. A arranges for a four months' course, B for the whole session, and C never for more than two months in advance; and all these very much prefer the same day of the week for Lectures. On these points there must be a little concession on all hands for mutual benefit.

Failing to carry out the foregoing, Institutions, if armed with a list of accredited Lecturers on various subjects, might be solicited to make their Lecture arrangements, say in June or July, and transmit their wishes to the Society of Arts on a certain day, when the Central Committee might greatly facilitate the subsequent arrangements to the mutual convenience of all. It is true this has failed in Yorkshire; but it may succeed further south. Although I believe that a better understanding between Provincial Institutions is *one* of the *good things* in the "*good time coming*," I submit that the Society of Arts would be only acting the part of parental duty by recommending to its affiliated Institutions a more kindly and fraternal spirit, believing that they cannot help each other without being more than equally helped in return.

I am, Sir, yours faithfully,
E. W.

## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

**Royal Geographical Society.**—The last meeting of this Society for the Session was held on Monday week, in the Theatre of the Royal Institution, Albemarle-street; Sir Roderick Murchison in the chair. The communications were: 1. "Island of Chusan." By Sir John F. Davis, Bart.; with map. 2. "Peninsula of Samana, in St. Domingo." By Sir Robert Schomburg; with map. Communicated by the Foreign-office. 3. "Rio Negro, and the Head Waters of the Amazon." By Alfred R. Wallace, Esq.; with map. 4. Rio Maulé in China." By Captain Walter Hall; with map. 5. "Remarks on the Levels taken in Jerusalem with the Aneroid." By Capt. W. Allen; with illustrations. 6. "Excursion from the Atrato to the Bay of Cupica." By Commander Friend, R.N. Communicated by Capt. Barnett, R.N. 7. "Contributions to the Arctic Geography of the Norsemen." By Professor Ch. Rafa, of Copenhagen, &c.—Chusan.—This island, important from its geographical position, being in 30 degrees of north latitude, appears to deserve more attention than has hitherto been bestowed upon it in this country. It is fifty-one miles in circumference, possessing in most parts a rich and fertile soil, with an industrious half-Chinese, half-Japanese population of 200,000 souls, within eighty miles of the embouchure of the great Yang-tse-Kiang, or Yellow River, and not more than forty from Chapoo, (or the main land from whence the imperial trade to Japan is carried on), the importance of its position, in a commercial point of view, cannot be over-estimated. The harbour on the south side of the island, adjoining the capital, Tinghai, is good and safe, but from the strong tides and numerous sunken rocks, it requires care in approaching and entering. The tides, indeed, are exceedingly strong—at times, nine knots an hour—and the rise and fall in places so irregular and unknown that too much care can hardly be given to the difficult navigation of this part of the coast. The climate, of which accurate Tables were kept during our occupation of the island, appears temperate and wholesome, and the unfortunate mortality amongst our troops seems to have arisen from bad lodging and bad food, combined with the immoderate use of the pernicious Chinese spirit, "samshoo." The average temperature is very low, considering the latitude of the island; north-west winds prevail throughout the year, and it is only during the months of July and August that the climate is at all oppressive to Europeans. The wet and dry seasons here and at Hong-Kong are reversed, at Chusan the winter being the rainy season, though only a difference of eight degrees of latitude intervenes. Rice is the staple product of the island, and appears to be cultivated with all the care and patient industry for which the Chinese are so remarkable. The cotton plant is also largely cultivated near the sea; it is of a very fine fibre, and superior to what is imported from India. The tea plant grows wild, but is much neglected. The apple, pear, plum, and apricot-trees, grow in the island, as does the valuable camphor-tree, but are all neglected for rice, which is encouraged by a beautiful and perfect system of canal irrigation; and stone dykes, three and even four in number, are frequently erected, to keep out the inroads of the sea. The capital, Tinghai, had, during the time of our occupation, a population of 30,000 souls. It is on the south side of the island, about half a mile from the sea-beach, and defended by a wall of about three miles in circumference, situated in a fertile valley, everywhere intersected by canals, as is the town itself. The adjoining seas abound with fish; and in the neighbourhood of the island the delicious mandarin fish is caught, and sent in great numbers in boats, in packed ice, to the main land. This fishery alone employs upwards of 1,000 boats. Fowls and ducks are raised in great quantities, and hatched by artificial means, forty ducklings being sold for one dollar. The food of all classes is rice; and as they have a great aversion to beef, milk, or butter, rice, and fish of all kinds, with barley, sweet potatoes, and millet, for the poorer classes, constitute their daily meals. The character of the population is that of China in general,—"hardworking and patient, but lying, thievish, and faithless." They are patterns, however, of contentment and cheerfulness, under difficulties. Female infanticide prevails on the island, as elsewhere in China, and few are rich enough to have more than one wife. Their religion is the grossest idolatry; the priests, however, exercise no influence over the minds of the people, being generally treated with contempt; and they chiefly subsist on alms. There is an abundance of small temples, or joss houses, all over the country. Education does not appear to be so much attended to as elsewhere in China, although two colleges existed when we took possession of the island, the mass of the population, from their extreme poverty, being neither able to read nor write. —The President directed attention to the expedition proposed by Mr. Ernest Haug, to ascend the Victoria River in North Australia, thence to penetrate to the east towards the Gulf of Carpentaria, and the country behind the present so rapidly increasing colonies of Eastern Australia. Two of the aborigines who had lately arrived in this country were present, under the care of Dr. Hodgkin and Mr. Cull, and Mr. Brierley's beautiful sketches of the country about the Cape York Peninsula, were greatly admired. Mention was next made of the departure of Mr. Albert Robinson, who, in his yacht, was about to proceed to Greenland to investigate the mineral resources of that country.

## PROCEEDINGS OF INSTITUTIONS.

**Bury St. Edmunds.**—From the Third Annual Report of the Young Men's Institute, it appears that during the past session it had numbered 402 members; its receipts had been 240*l.*; whilst the number of lectures, conversazioni, &c., had been 32. Of classes, 5 had been in active operation; viz., Music, Drawing, Arithmetic, English Grammar, and French,—giving an average attendance of 60 weekly. In about nine months there had been an issue of 5,628 books and periodicals, and the average attendance in the Reading-room 250 per week. At the recent Anniversary (the sixth from its origin), a handsome testimonial was presented by the members to C. W. Jones, Esq., the Honorary Secretary of the Institute, in consideration of valuable services, in raising the society to its present prosperous position. A presentation was likewise made to the Treasurer. In returning thanks Mr. Jones said, "It would not be uninteresting to glance at the History of the Institution, whose anniversary they were then celebrating, and to be reminded of the unpretending source whence sprung the rivulet which had expanded itself into so large a river. He would enumerate in order the various epochs of its eventful career. 1. In 1847 the 'Mutual Improvement Association' was launched into being, under the guidance of only six working young men. 2. In 1850 it was re-organised as the 'Young Men's Institute,' for Lectures and Classes. 3. In 1852 it became necessary to extend its operations, by adding a Reading-room and Library. 4. And in the present year, 1853, the society had developed itself into the 'Athenæum,' embracing not only all its former usefulness, but also a Museum, and an Institute of Archæology and Natural History. He would further bring before their notice a few proofs of the prosperous operations of the Young Men's Institute, giving them a comparative statement for the three last years. 1. Members in 1851, 257; in 1852, 345; and in 1853, 402. 2. Lectures, Conversazioni, &c., in 1851, 50; in 1852, 31; and in 1853, 32. 3. Funds on the receipt side, in 1851, 63*l.*; in 1852, 121*l.*; and in 1853, 240*l.*, with a large balance each year on the right side. Thus in three years the society numbered 1,004 members, 113 lectures, and 424*l.* 4. Property,—They possessed a valuable library of upwards of 2,000 volumes; with maps, busts, drawings, diagrams, and the necessary paraphernalia of a Reading-room, Library, and Class-rooms. 5. Attendance at lectures,—By taking a fair average of the audiences, the aggregate attendance would be above 22,000. He had now given a proof of the *hearing*, and would proceed to the *reading*. 6. Issue of books,—In little more than nine months 5,628 volumes had been circulated. 7. Attendance in Library—This had been of the most encouraging character, and averaged in a week no less than 250. 8. Classes,—The success of these was evident, from an average of 60 attendances in a week."

**Poole.**—The members of the Town and County Library and Literary Institute held their Annual Meeting in the Library on Friday evening, the 28th ult., John Durant, Esq., in the chair. The report, as read by the Honorary Secretary, stated that one of the most important events which had occurred since the last meeting was the arrangement which had been made with the Society of Arts, by which many of the privileges hitherto only enjoyed by that body have been conferred upon this Institute. The financial report showed a balance of 11*l.* 15*s.* 10*d.* in the hands of the Treasurer, and outstanding subscriptions to the amount of 24*l.* 6*s.* The meeting then proceeded to the election of officers, when Major Waugh, of Branksea Castle, was elected President, and the Vice-Presidents, and Committee were re-elected, together with the Treasurer, H. M. Aldridge, Esq., Librarian, Mr. G. H. Gutch, and the Honorary Secretary, Mr. J. B. Bloomfield.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the Journal regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

"J. W. B"—To the first question—early in July; to the second —yes.

"A Reader" should apply to the Secretary of the Society of Arts.

*Errata.*—In Weekly List of Patents Sealed, page 376, 51 lines from the top; *for*

Year, 1853:

85. William Nairn, of South Inch Mills, Perth—Improvements in reeling yarns or threads: *read*

Year, 1852:

85. Joseph Brandeis, of 92, Great Tower-street—Improvements in the manufacture of sugar and saccharine solutions.

## MISCELLANEA.

STATISTICS OF EDUCATION, ADULT AND JUVENILE, IN THE CITY OF CARLISLE.—The population of Carlisle is a trifle less than 30,000. It has 14 public literary Institutions—libraries, news-rooms, and both combined—of which 3 are for the middle and wealthier classes, at a charge of a guinea a year or more to each member; and 11 for the humbler classes, of which 2 are at the rate of twopence, and 9 at a penny a week. Of those at twopence, the Mechanics' Institute (chiefly frequented by clerks, assistants, and apprentices to shopkeepers,) has the lion's share of public support, is of many years' longer standing than its humbler colleagues, numbers 630 members, and has a library of 3,500 volumes, with a news-room containing 3 daily and 14 weekly papers, 6 quarterly and monthly and 12 weekly periodicals. The Temperance news-room, at the same charge of twopence a week, is of six years' standing, has 98 members, 87 volumes, 4 daily and 10 weekly papers, and 4 magazines. Of the 9 rooms at a penny a week, 5 present a feature of peculiar interest, being entirely under the management of working men; these 5 genuine working men's reading-rooms give a total of 609 members, averaging 122 to each Institution; have 2,067 volumes among them, at an average of 413 to each; have 6 daily papers, or more than 1 apiece; have 48 weekly papers among them, or 9 apiece; and 14 monthly and 41 weekly periodicals among them, or 3 and 8 respectively to each. Of the remaining 4 rooms at a penny a week, the superintendence rests with others than working men; these include 429 members, and average 107; with 1,709 volumes in all, averaging 427 each; 5 daily and 21 weekly papers, being respectively 1 and 5 to each; with 8 monthly and 17 weekly periodicals, giving 2 and 4 to each. The penny rooms, taken first alone, and then with the twopenny rooms, give the following totals:—Members, 1,038 and 1,766; volumes, 3,766 and 7,363; daily papers, 11 and 18; bi-weekly and weekly papers, 69 and 93; quarterly and monthly magazines, 22 and 32; and weekly periodicals, 58 and 70. The members of these 11 cheap rooms run 6 per cent. to the entire population, and if it be supposed that some, by enrolling in more rooms than one, may be reckoned twice or oftener, it must be remembered that the other 3 of the 14 Institutions have not been analysed at all. There are in Carlisle 9 public day-schools for the humbler classes, entry to which is either gratuitous or at a merely nominal charge. In these there are at this time (June, 1853) 1,853 scholars, averaging about 206 to each, and being above 6 per cent. of the entire population. There are, besides, 8 public Sunday-schools, numbering in all 1,190 scholars, and averaging about 149 to each. It is not known how many of the children are counted both in the week-day and Sunday-schools; but neither are all the latter given, nor yet the grammar-school, nor of course any of the numerous private or proprietary schools, some of which are very numerously attended.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 15th June*, 1853.

289(1). New Windsor Election—Index to Minutes of Evidence.
290(1). Maldon Election—Index to Minutes of Evidence.
536. Select Committees—Return (a corrected copy.)
585. Vessels, Tonnage, &c.—Return.
590. Bills—Spitalfields to Shoreditch Improvement.
607. ,, —Succession Duty (amended).
609. Parish Vestries (No. 2.)

*Delivered on 16th June.*

375(1). Leicester Election—Index to Minutes of Evidence.
382(1). Barnstaple Election—Index to Minutes of Evidence.
377. Rated Occupiers (Ireland)—Abstract Return.
528. Cork Election—Minutes of Evidence.
612. Raisins—Copy of Correspondence.
606. Bills—Burial Grounds.
601(a). ,, —Excise Duties on Spirits (Clauses to be proposed.)
Cape of Good Hope—Copies of two Ordinances.

*Delivered on 17th June.*

604. Berwick-upon-Tweed Election Petition—Report from Committee.
610. Bill—Evidence Amendment.
Revenue, Population, Commerce, &c.—Tables; Supplement to Part XVIII., Sec. B.

*Delivered on 18th and 20th June.*

569. Bury St. Edmund's Election—Report from Committee.
572. Sligo Election—Report from Committee.
600. Sligo Election—Minutes of Evidence.
616. Income Tax—Return.
608. Bills—Common Lodging-houses (Amended.)
613. ,, —Municipal Corporations Act Amendment (Amended).
621. ,, —Westminster Bridge (as amended by Select Committee.)
623. ,, —Resident Magistrates (Ireland).
624. ,, —Malicious Injuries (Ireland.)
625. ,, —Soap Duties.
626. ,, —Simony Law Amendment.
Arterial Drainage in Ireland—Report of Commissioners.

*Delivered on 21st June.*

504. Customs Duties—Return.
581. Dockyards, &c.—Return.
598. Lead and Lead Ore—Account.
627. Indian Territories—Lords' First Report.
Factories—Reports of the Inspectors.

*Delivered on 22nd June.*

377(1). Rye Election (Further Inquiry)—Index.
531. Drunkenness, &c.—Abstract of Return.
580. Peterborough Election—Report.
597. Coal-laden Vessels—Copy of a Memorial.
611. St. George the Martyr (Middlesex)—Return.
617. Customs—Return.
632. Government of India—Correspondence.
633. Customs—List of Articles.
630. Bill—Landlord and Tenant (Ireland), as amended by the Select Committee).
637. ,, —Assessed Taxes.
Criminal Offenders (Scotland)—Tables.

## PATENT 'LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette*, 17*th June*, 1853.

*Dated 19th April*, 1853.

940. W. Hale—Fire-arms.

*Dated 9th May.*

1134. E. B. Beaumont—Construction of dwelling-houses and bricks and tiles.

*Dated 27th May.*

1306. A. M. Servan—Manufacture of candles.

*Dated 28th May.*

1312. W. Smith—Submarine telegraph cables.

*Dated 30th May.*

1332. R. A. Brooman—Fire-arms. (A communication.)

*Dated 1st June.*

1340. E. Wilkins—Flower-pots.
1344. J. L. Lemaire-Daimé—Play-arms.

*Dated 2nd June.*

1348. W. Knowles—Machinery for warping, &c.
1349. J. Whitworth—Machinery for cutting and harvesting corn.
1350. J. Whitworth—Perforating paper, &c.
1351. J. R. Johnson—Manufacture of type, &c.
1352. W. Thorold—Portable houses, &c.
1353. R. L. Hattersley—Machinery for forging iron.
1354. W. H. Smith—Parchment.
1355. A. R. C. Madoré and D. Neuberger—Shirts.
1356. H. Hughes and W. T. Denham—Weaving machinery.
1357. R. S. Barleet—Needles.
1358. R. M. Cummins and J. de Cock Kenifeck—Flax machinery.
1359. W. Boyd—Chlorine or chlorides.
1360. W. E. Newton—Soles for boots, &c. (A communication.)

*Dated 3rd June.*

1361. W. Wahler—Self-acting lithographic printing-machine.
1362. J. Durandeau—Marks and designs in paper.
1363. F. L. Gossart—System of permanent circulation of caloric.
1365. J. S. Wilson—Digging-machine.
1366. J. Kendrick—Steam-boilers.
1367. T. B. Daft—Inkstands.
1368. R. Robbins—Grinding wheat, &c.
1369. J. Hayes—Raising and stacking straw, hay, corn, &c.
1370. W. E. Maude—Carriages. (A communication.)
1371. W. E. Maude—Steering ships. (A communication.)

*Dated 4th June.*

1372. C. F. Lenz—Mechanism to prevent loss of force by friction. (A communication.)
1373. W. Bradburn—Grease and oil.
1374. J. Gyde—Grinding and dressing corn, &c.
1377. H. J. Betjemann—Chairs.
1378. E. B. Beaumont—Bricks and tiles.
1379. J. Burch—Fans, blasts, &c.
1380. W. Dray—Driving shafting.
1381. B. Biram—Working and ventilating mines.
1382. T. R. Nash—Filters.
1383. C. Schiele—Pressure indicators.
1384. J. Whitehead—Pipes, &c., from plastic materials.
1385. T. Richbell—Slate for building.

*Dated 6th June.*

1386. G. Carter and G. Marriott—White lead.
1387. J. Gundry—Fishing-nets.
1389. A. B. Baron von Rathen—Motive power.
1391. C. Nickels—Weaving.
1393. H. Wiglesworth—Coupling railway carriages.

*Dated 7th June.*

1395. H. G. Rowe, and A. G. and W. H. Andrew—Fastening handles of knives, &c.
1396. F. Lipscombe—Ships and boats.
1397. E. Lavender—Manufacture of fuel, and machinery for same.
1398. A. V. Newton—Chest-expander and abdominal supporter. (A communication.)
1401. R. B. Cousens—Manufacture of casks, &c.

*Dated 8th June.*

1402. F. L. H. Danchell and W. Startin—Obtaining auriferous deposits from beds of rivers, &c.
1403. G. Tillett—Portable houses.
1404. J. Horrocks—Percussion caps.

APPLICATION WITH COMPLETE SPECIFICATION FILED.

1408. A. Ponçon—Motive power. 9th June, 1853.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 16th June*, 1853.

Year, 1852:

1077. Richard Blades, of Liverpool—Improvements in the method of cleansing sewers and drains, and in the machinery or apparatus connected therewith.
1080. Thomas Motley, of Bristol—Improvements in constructing the tablets, letters, and figures for indicating the names, designations, or numbers of streets, houses, buildings, and other places.
1081. Auguste Edouard Loradoux Bellford, of 16, Castle-street, Holborn—Invention of a new system of stoppering bottles and other vessels. (A communication.)

*Sealed 17th June*, 1853.

1134. John Filmore Kingston, of Carrol County, State of Maryland, United States of America—Improvements in obtaining motive power by electro-magnets.

Year, 1853:

44. Charles De Bergue, of Dowgate-hill, City—Improvements in the permanent way of railways.
167. John Medworth, of 9, Claremont-cottages, Campden-hill, Kensington, and Lawrence Lee, of 498, New Oxford-street—Improvements in lithographic presses.
169. Peter Hubert Desvignes and Francis Xavier Kukla, of Lewisham, Kent—Improvements in galvanic batteries.
367. William Choppin, of London—Improvements in locks.
476. John Grist, of Hoxton—Improvements in machinery for the manufacture of casks, barrels, and other similar vessels.
672. George Rock Lucas, of Dronfield, near Sheffield—Improvements in the method of raising water and other materials from mines.
877. Downes Edwards, of Ravenscliffe, Douglas, Isle of Man—Improvements in signal apparatus for railways.
890. James Noble, of Leeds—Improvements in preparing cotton and other fibres.
894. James Noble, of Leeds—Improvements in preparing cotton and other fibres.
945. Christian Böhringer and Gustavus Clemm, Directors of the Chemical Works, Wohlgelegen, near Mannheim, and Heilbronn, Baden, Wurtemburg—Improvements in the manufacture of soda and potash.
961. Juan Duran, of Puerta del Sol, Madrid—Invention of obtaining and applying motive power.
985. George Fergusson Wilson, of Belmont, Vauxhall, William Henry Hatcher, of Mann-street, Old Kent-road, and John Jackson, of Southville, Wandsworth-road—Improvements in apparatus for manufacturing moulded candles.
1004. Moses Poole, of Avenue-road, Regent's-park—Improvements in the manufacture of porcelain and like wares. (A communication.)
1007. George Ferdinand de Fonveille, of 13, Rue de la Darce—Invention of a filtering-machine, which acts under water, and is applicable to the filtering of all liquids.
1024. Richard Jordan Gatling, of Indiana, United States of America—Invention for distributing power to machine-shops, factories, and other places.
1067. Christian Radunsky, of Cockspur-street—Improvements in electro-voltaic apparatus. (A communication.)

*Sealed 21st June*, 1853.

Year, 1852:

1117. Robert Powell, of Berwick-street, Golden-square—Improvements in coats and other garments.
1133. John Henry Johnson, of 47, Lincoln's-inn Fields, and Glasgow—Improvements in machinery or apparatus for forging iron and other metals. (A communication.)
1137. Frederick Aykbourn, of 99, Guildford-street, Russell-square—Improvements in rendering certain materials impervious by air or water.
1166. Pierre Charles Nesmond, of Bellac, Haut Vienne, France—Improvements in machinery applicable to the manufacture of ice, and to refrigerative purposes generally.
1197. Auguste Edouard Loradoux Bellford, of 16, Castle-street, Holborn—Improvements in machinery for grinding and reducing gold quartz to an impalpable powder, and amalgamating the said ground quartz with quicksilver; the same being applicable also to the pulverising and washing of ores. (A communication.)
1201. Henry Hutchinson, of Sheffield—Improvements in machines for washing bottles.
1202. James Ward and William Burman, of Stratford-on-Avon—Improvements in machinery for making bricks and tiles.

Year, 1853:

84. George Augustus Huddart, of Brynkir, Caernarvon—Improvements applicable to steam regenerators.
208. William and John Galloway, of Manchester—Improvements in steam-engines and boilers.
283. Auguste Edouard Loradoux Bellford, of 16, Castle-street, Holborn—Improvements in furnaces and apparatus combined therewith, for making wrought iron directly from the ore, and for collecting and condensing the oxides or other substances evaporated in the process of deoxiding iron or other ores. (A communication.)
609. Edward Taylor Bellhouse, of Manchester—Improvements in iron structures.
670. Auguste Edouard Loradoux Bellford, of 16, Castle-street, Holborn—Improvements in power-looms. (A communication.)
715. Robert Grundy, of Hindley, and James Jones, of Warrington—Improvements in machinery for preparing, spinning, and doubling cotton and other fibrous materials.
732. James Worrall, junior, of Salford—Improvements in the method of preparing, treating, and finishing cut, piled, or raised fustians, and other similar goods or fabrics, and in the machinery or apparatus connected therewith.
768. James Worrall, junior, of Salford—Improvements in the method of preparing, treating, and finishing certain textile fabrics called cords, thicksets, velveteens, and beaverteens.
966. William H. Johnson, of Granville, Hampden, Massachusetts—Invention of sewing cloth, leather, and other materials.
967. William Edward Newton, of 66, Chancery-lane—Improvements in machinery for bending wood or other materials. (A communication.)
997. Jacques Emile Joffriaud, of Paris—Improvements in machinery or apparatus for washing earths containing gold, extracted from the bottoms of rivers or other waters.
1016. George Turner, of Bradley-terrace, Wandsworth-road, and Robert Holloway, of St. James's-street, Hatcham New Town, Old Kent-road—Improvements in the manufacture of unfermented bread, which improvements are also applicable to other purposes as a substitute for yeast.
1040. Robert Davison, of 33, Mark-lane, and James Scott Horrocks, of Heaton Norris, Lancashire—Improvements in the means of conveying and distributing or separating granular and other substances.
1078. Louis Corindes, of 4, Trafalgar-square—Improvements in treating certain ores and minerals for the purpose of obtaining products therefrom.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| June 16 | 3477 | Sash-fastener. | Thomas James Perry | Lozells, near Birmingham. |
| " 20 | 3478 | Duck and Wilson's Improved High-pressure Cistern Cock. | W. Duck and W. Wilson | 49 & 52, London-road, Southwark. |

# SOCIETY OF ARTS.

## FRIDAY, JULY 1st, 1853.

## ON RECENT IMPROVEMENTS IN THE MANUFACTURE OF SUGAR FROM THE SUGAR CANE AND BEET-ROOT.

BY DR. EDWARD STOLLÉ, OF BERLIN.

As this subject differs essentially in its bearings and scope from a former one, for the treatment of which the Society was pleased to award me the gold Prize Medal last year, I venture to look on myself as justified in entering the ranks of competitors again, and take the liberty herewith of laying before the Society my special researches on the importance of beet-root sugar manufacture as compared with that of colonial sugar; and of appending to these an accurate Report of the further development of my discovery of a new method for producing cane-sugar, which I mentioned and substantiated on scientific grounds in my paper of June 10th, 1850.

Whilst almost every packet from the British West Indies brings melancholy tidings of the state of the sugar manufacture there; and the latest newspapers, in fact, mention that since 1848, about 128 estates have *totally* abandoned cultivation, and seventy-eight others have let the half of their cane-fields lie fallow, their European rival is advancing with irresistible and gigantic strides towards complete development, as a mere cursory glance at my Map, exhibiting the extent and progress of the beet-root sugar manufacture, will suffice to convince. This fact alone proves most urgently the necessity of a thorough reform in the antiquated, almost antediluvian process of sugar manufacture in the colonies.

We must bear in mind above all, that the manufacture of sugar from beet-root (which is indigenous to Europe, and is protected and cherished with paternal care, and even sometimes with undue partiality by the various Governments of those States in which it is carried on), enjoys from the very nature of the attendant circumstances, and will for some time to come continue to enjoy, certain advantages over its competitor: these advantages may be stated under six heads, viz.:

1. The superior intelligence, skill and attention of the operatives employed.
2. The superiority and ingenuity of the machinery used, any necessary repairs of which can be executed without delay or difficulty.
3. The opportunities of association and contact with the men of intellectual progress, with natural philosophers and engineers, who devote a large amount of attention to this subject.
4. The constant presence of the proprietors of the various works, which are, moreover, conducted by able, conscientious, and thoroughly informed managers.
5. The facility which the numerous population of the provinces in which this manufacture is chiefly carried on, offers for obtaining the necessary supply of labour, whether for the cultivation of the raw material, the beet-root, or for the production of the sugar (which is carried on in the winter); and,
6. The more favourable climate; since, in consequence of the lower temperature of Europe offering less danger of fermentation, the risks in the production of sugar are extremely reduced.

Every one who is in any degree acquainted with the state of things in the Colonies, more particularly in the British, will see clearly, that the production of sugar from canes stands at a great disadvantage as compared with the favourable circumstances stated above, attendant on the manufacture of sugar from beet-root; since it is only too well known, that the proprietors of plantations in the West Indies are wont to spend their time and resources at home in the mother-country, and carelessly to leave the management of their sugar-works to individuals for the most part but ill-qualified to discharge the trust; and who, in their aversion to trouble, and being put out of their accustomed routine, throw obstacles in the way of any improvements being introduced, the result of which would only benefit the pocket of their employer. The few exceptions that may be made to this sweeping remark, will not controvert its truth. These two circumstances alone suffice to explain why every improvement in the manufacture of sugar, even when established by unerring experiments, finds so great difficulty in making its way in the Colonies.

It will, perhaps, be answered, that if the zeal and enterprise of the planters have been paralyzed, this is chiefly to be attributed to the costliness of the experience which they have from time to time acquired at the hands of sciolists and soi-disant reformers of the manufacture in question: but even here it is clear, the planters must themselves bear the chief blame, for it is generally the most puffing and extravagant projects that have the best prospect of being adopted by men deficient in sagacity and practical knowledge (as is for the most part the case with the proprietors of plantations), and who are therefore dependent on the goodwill of their subordinates and hirelings for their judgment of the usefulness or undesirableness of any proposals made to them.

On the subject of the present extent of the manufacture of sugar from beet-root in Europe, and its importance as a matter of political economy, every information is afforded by the two maps, which accompany this paper, namely—

1. Map exhibiting the geographical extension of the manufacture of beet-root sugar in Europe.
2. Map exhibiting the geographical extension of the production of sugar in general throughout the world.

The statistical tables and notices attached to them* afford a complete picture of the former manufacturer's future prospects, and capacity for competition, even allowing for the possibility that the governments of the states interested should, within any moderate period, determine to place the taxation of both kinds of sugar on an equal footing.

However interesting it may be to the study of the geography of plants, it is infinitely more so to the profitable working of this root to notice, that throughout the region embraced between the 49th and 53rd degree of north latitude the beet-root thrives equally; that is to say, possesses an equal amount of saccharine matter; whilst southwards from this line it loses in sweetness at a very striking rate. Locality, either eastward or westward, on the contrary, is without influence on the formation of the saccharine element; at any rate, the chemical analyses of beet, which were made under similar circumstances in the Department du Nord and the Government of Kiew (an area of 28° longitude), did not show any difference in the saccharine contents. This circumstance explains how it is that this manufacture develops itself with equal success in the mild climate of Normandy and the rude uplands of White Russia.

In most German manufactories of beet-root sugar, it has been the practice for many years to extract direct from the beet, and without any further manipulation, a product similar to refined sugar, called "Saftmelis" (literally "Juice Sugar"), which becomes at once an article of trade and consumption; a process that in most cases takes fourteen days, but which will very shortly require only half that time; so that in a regular course of manufacture the beet that is taken in hand to-day will give a sugar ready for sale within six, or at latest eight, days hence. Now this sugar can, in the better sort of sugar-houses, be produced for 11⅓ thalers (34*s.*) per cwt., after paying the beet-root duty of 1½ thaler, or 4*s.* 6*d.* per cwt.; whilst a similar sugar from abroad cannot be imported under 18½ to 19 thalers (55*s.* 6*d.* to 57*s.*) per cwt. Supposing then that the present duty on beet-root sugar should be doubled, or what is very unlikely, even trebled, and so amount to 4½ thalers (13*s.* 6*d.*), thus putting it on a perfectly equal footing with the duty on Java sugars and the slave-produced sugars of Brazil, the production of beet-root sugar of a better quality would still not exceed 14⅓ thalers (43*s.*) per cwt., so that plenty of room would still be left for the competition of beet-root sugar.

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* Portions of the Statistics contained in these Maps have appeared in the Society's Journal.—*See* No. 20, p. 233.

The raw sugar from beet-root (Muscovado) is, of course, produced still more cheaply; the prime cost may be reckoned on the average at 8 thalers (24*s.*) per cwt., including duty. That it is also possible to produce it at less cost is proved by the following statement, drawn up by the manager of a well-known manufactory of beet-root sugar, which in the concluding paragraph demonstrates a prime cost of 6 1/12 thalers (18*s.* 3*d.*) per cwt.

STATEMENT

of the cost price of beet-root sugar in a manufactory working from 25,000 cwt. to 30,000 cwt. of beet in about five months.

| | Thalers | £. | *s.* | *d.* |
|---|---|---|---|---|
| 1. 30,000 cwt. beet, at 5 slbg. (6*d.*) per cwt. | 5,000 | 750 | 0 | 0 |
| 2. Fuel | 3,380 | 507 | 0 | 0 |
| 3. Wages | 1,830 | 274 | 10 | 0 |
| 4. Sundry expenses connected with the manufacture, such as press cloths, petty utensils, lighting, repairs of utensils, etc., building, lime, counting-house expenses, etc. | 1,160 | 174 | 0 | 0 |
| 5. Animal charcoal | 515 | 77 | 5 | 0 |
| 6. Motive power | 300 | 45 | 0 | 0 |
| 7. Interest on capital (active and sunk) R. F. 25,000 at 4 per cent. | 1,000 | 150 | 0 | 0 |
| 8. Fire insurance and various taxes | 650 | 97 | 10 | 0 |
| 9. Salary of manager | 500 | 75 | 0 | 0 |
| 10. Wear and tear | 700 | 105 | 0 | 0 |
| Thalers | 15,035 | £2,255 | 5 | 0 |
| DEDUCT | | | | |
| A. For 500 cwt. treacle, which under any circumstances is always worth 15 slbg. (1*s.* 6*d.*) per cwt. | 250 | 37 | 10 | 0 |
| B. For refuse from the presses, viz., what remains after feeding the draught cattle employed in the works (the greater part having thus been already turned to account) at 2½ slbg. per cwt. | 125 | 18 | 15 | 0 |
| C. For refuse to be used as manure (consisting of impurities precipitated from the juice in defecation) about 130 cart loads, at 15 slbg. (1*s.* 6*d.*) per load | 60 | 9 | 0 | 0 |
| Thalers | 435 | £65 | 5 | 0 |

which leaves 14,600 thalers, or 2,190*l.* as the total cost, including all labour and expenses of working of 30,000 cwt. (1,500 tons) of beet-root, or 7*l.* 6*s.* per 100 cwt. (5 tons).

"In this manufactory at Gotha (the report says further) there were obtained on an average of the years 1840, 1841, 1842, and 1843,—6·33, 6·8, and 7·4 per cent. raw sugar. If we take the mean of these at 6·8 of crystallized sugar (of which 5·1 should be first crystallization), the hundred-weight of raw sugar will cost 7 thalers, 5 slbg. (21*s.* 6*d.*); and where the produce amounts, as it does in many manufactories, to 8 per cent., the cwt. costs only 6 1/12 thalers (18*s.* 3*d.*)"

This statement, which was drawn up ten years ago, assumes, as we have seen, 8 per cent. raw sugar as the highest produce from beet. When we, however, take into consideration that the more skilful manufacturers already obtain 8½ and 9 per cent. raw sugar, and some individuals indeed as much as 10 per cent., it must be conceded that this manufacture has already got a tremendous start over its colonial rival, and will put the latter to its mettle to escape being distanced in the race of competition.

It is true that the cost price of raw sugar, under the present coercive system on the island of Java, seems to come still lower, inasmuch as the pikul (60 kilo) of sugar can be delivered at the port for 5 gulden. Brazilian sugar is also said to be put on board for 1⅔ thalers (5*s.*) per cwt.; and Mr. Sullivan (see Parliamentary Reports of 1850) calculates East Indian sugar to come still cheaper, namely, at 4*s.* per cwt. in London. His calculation is as follows:

| | |
|---|---|
| Cost of production | 7 shillings. |
| Freight | 7 ,, |
| | 14 ,, |
| Deduct value of rum from the molasses | 10 ,, |
| Amount of the cost price of sugar per cwt. | 4 ,, |

In striking contrast to these sanguine assumptions, it nevertheless remains incontestible that the cost of production of raw sugar in the West Indies, amounts to a much higher sum—nearly to three and four-fold this amount—and that it is therefore indispensably necessary to strive energetically to reduce it, and eventually improve the process of manufacture.

A more profitable production is to be obtained in two ways:

1st—By producing a more excellent and improved article, the selling price of which shall be incontestibly higher; or,

2ndly—By obtaining a greater quantity of the product of as good a quality as before.

It has been my endeavour to extend my improvements in both these directions, and while my attention was in the first instance directed chiefly to the improvement of the article manufactured, and, without increase of expense, to attain a purer, and consequently more valuable sugar; I have subsequently turned my attention more particularly to obtaining a larger produce, and, as I need hardly say, without detriment to the superiority of the quality.

The success which has crowned the actual introduction into Jamaica of my method of clarification (defecation), and which has paved the way for its extension into almost all the colonies, has doubtless been brought to the knowledge of the Society by its repeated mention in various newspapers. Moreover, this success is the result of the discovery which I have already had the honour of explaining to the Society in the year 1850, and for which it was pleased to award me the gold prize medal. What, however, has most particularly favoured the practical application of my principle, is the fortunate circumstance that I have succeeded in inventing a "finings," which, in addition to the antiseptic properties of my method already alluded to, possesses two other most valuable qualities, as by its application—1st, a *clarifying*, and 2ndly, a *decolouring* action is simultaneously produced. My lately-invented sugar-"finings" has this advantage over the process I formerly communicated, in that the planter can at all times purchase it ready made, can keep it for years without injury to its efficacy, and requires no apparatus of a more or less costly and intricate nature for its application, not to mention the not unimportant circumstance, that this sugar-"finings," notwithstanding its undoubtedly greater efficacy, costs him a third, if not a half less, than if he himself, even under the most advantageous circumstances, prepared for his own use the sulphurous-acid or any sulphite whatever.

My new "finings" is perfectly innocuous to the health, and its application is at the same time so simple, and its results so brilliant, that it has met with the most general and rapid introduction under the name of "*Dr. Stollé's Arcanum*," to such an extent, indeed, that its continually-increasing sale has rendered the establishment of agencies necessary in most of the sugar-producing colonies. The handbill appended gives the name of my agents in Cuba, Porto Rico, Louisiana, Bahia, Pernambuco, and many other places.

The admixture of an almost homœopathic dose of my arcanum with the juice, at the moment of its expression from the cane, suffices to preserve it for a considerable time from fermentation, and render a perfect defecation and decoloration possible in the separating process which follows.

When the arcanum is rightly applied, the defecated juice appears as a clear transparent fluid of a pale yellow colour, it evaporates easily, is less liable than juice treated in the ordinary method is to burning (caramelisation), and produces, if not prevented by carelessness and inattention during boiling, white, sharply-formed crystals, which easily separate from the mother liquor (molasses).

As to the successful working of my newly-invented "finings," when used on a large scale, a letter, from his Excellency Lord Howard de Walden and Seaford, dated March 14th, 1852, affords most conclusive evidence. In addition to this, I take the liberty of adducing a further instance of still more recent date, which shows that my invention has already made its way into other regions than the West Indies. Under date of 5th instant, my general agents, Messrs. H. F. Merck and Co., in Hamburg, write to me as follows: "We have had the pleasure of learning through Messrs. Bieber and Co., in Bahia (our agents), that a trial made there with Dr. Stollé's Arcanum, has produced *the gratifying result of 12½ per cent. increase in the yield of sugar*."

This improvement, which has been already established, and proved to be such by actual use, appertains more particularly to the *chemical* portion of the manufacture of sugar: I have also succeeded in introducing certain important improvements into the *mechanical* portion of this manufacture, which have been already recognised at their full value by men engaged in this trade.

The improvements I refer to consist in the construction of a small hanging centrifugal machine, peculiarly suited to colonial arrangements for throwing off the molasses: and further, the construction of a machine, preparatory to the use of the centrifugal machine, my so-called mash or kneading apparatus, the object of which is to impart the necessary uniformity to the sugar-paste, which is to be worked in the centrifugal machine, and thus expedite and carry out more thoroughly the process of throwing off the syrup. Both machines have been for two years' past in use in the sugar colonies, and the former of them, more particularly on account of its cheapness and usefulness, is much sought for, and meets with an extensive sale. In corroboration of the above, allow me to refer to a letter from my agents, Messrs. Wittering Brothers, in Amsterdam, dated January 31st, 1853, in which they write me as follows: "Your centrifugal-machine which we sent out has produced *a most advantageous result*, and cannot fail of giving rise to numerous orders; we have also had further demands for Stolle's Arcanum, which we have supplied from our stock."

It may not be superfluous to mention in addition, that in Jamaica alone, a dozen of my machines are working to the satisfaction of their owners, and that they are coming daily more and more into demand in the Brazils, and other sugar-producing countries.

In using the mash or kneading apparatus, the sugar paste is put in at the upper side of the chest (should the paste be too dense, it must be thinned by the addition of some syrup, or even water); the machine is then set in motion, and kept so (from four to five minutes are generally sufficient) till the whole quantity runs off, in the form of an uniform pap, at the lower opening. The crystals will be by no means injured by this operation; but on the contrary, a regular action of the centrifugal machine be secured; since this latter, when it gets pap of an uniform, and not too dense a consistency to cure, works much better, much quicker, and without jerking and jolting.

That which distinguishes my centrifugal machine, before all other similar contrivances, is the circumstance that it can be put up with very trifling expense, and without trouble, almost everywhere, and whilst performing a considerable amount of work, requires very small motive power to keep it going, and thus, in the absence of water, horse, or other motive power, can even be worked by hand with advantage,—a circumstance of peculiar value on small plantations.

Now that I have thus spoken of my inventions and improvements, the applicability and usefulness of which have already been placed beyond the reach of doubt by their actual employment in sugar plantations, there only remains for me to mention those improved mechanical contrivances which I am at present occupied in applying on a large scale, and all of which have for their object the attainment of an increased produce. They have reference to the three following principal stages of the manufacture of sugar, viz.:

1. The extraction of the juice;
2. The filtration of the juice after defecation; *i. e.*, of the solution of sugar from the organic and mineral substances held in suspension; and
3. Evaporation.

For the purpose of obtaining a more convenient and profitable extraction of juice, there have been, as is well known, for many years past, both with reference to beet-root and to sugar-cane, innumerable attempts made, but unfortunately, without exception, ill-contrived ones. The greater part of them failed, from the circumstance that an increased quantity of juice could only be obtained by the application of an unattainable amount of mechanical power, or at a great expense of money.

More powerful presses or mills than those at present in use in the colonies can in fact only be obtained by very considerable outlay, and at increased daily expenses of working; not to mention the evil that the cane, which has passed through their cylinders, is for the most part so crushed and broken up, that it can hardly be used for fuel, by which loss the gain from any increase of juice is reduced to a nullity.

In other cases the attempt has been made to adapt to the sugar cane that process of softening by steeping (called maceration) which has been already here and there applied to beet-root. This system, which has also been called imbibition, lixiviation, digestion, infusion, or *système de déplacement*, is nothing more or less than the application, on a large scale, of the drug presses, so much used by dispensing chemists. The circumstance that threw the greatest difficulty in the way of this system being introduced generally in the colonies, was the apparent necessity of dividing the sugar-cane, as had been the case with the beet, into small portions, or of cutting it up into thin slices, so as to procure for the dissolving action of the macerating fluid free access to the internal texture of the cane. By this proceeding, however, any subsequent use of this sliced sugar-cane as fuel was made a matter of impossibility, and the production became extremely enhanced in price, so that the increased produce of juice hardly sufficed to meet the increased expense of fuel.

I trust I have hit upon the right method to avoid the evils that attend both plans. What I propose is to retain in use the present sugar mill with three horizontal rollers, which, as is well known, with one pressing, extracts only from forty-five to fifty per cent. of the juice. Let now the sugar-cane, which I assume to have been cut into lengths of three feet before being passed between the rollers, be taken and bound loosely together in bundles, and put without delay into the "extruding apparatus." This apparatus consists of six vessels of wood or sheet iron, six feet high at least, and from four to five feet in diameter, connected together by syphon-shaped connecting tubes, closed at the top by a hermetically fitted lid, and at the bottom by an air-tight cover to the man-hole, which is to be used for the purpose of emptying the vessel. At the bottom of each vessel is a worm for the purpose of warming the liquid to the temperature desired. A few feet above these there stands a reservoir of water, which, by hydrostatic pressure, effects the extrusion (*déplacement*) of the juice.

The course of proceeding is as follows:

After the sugar-cane has been crushed in the mill and its interior thereby become accessible to the water it is bound together as before mentioned in loose bundles of about one foot in diameter and three feet in length, and taken to No. 1 vessel of the extruding-apparatus. As soon as this latter is about half-full, warm water (the temperature of which must not exceed 175° Fahrenheit), is gradually admitted to it from the reservoir, and the filling up of the vessel with bundles of pressed cane continued. As soon as the vessel No. 1 is filled up to the top with these bundles, the lid is closed hermetically, and the same process is commenced with No. 2, and carried on till Nos. 3, 4, 5, and so on, are filled and fastened down. The water has in the mean time risen up to the underside of the lid of No. 1, and then runs over through the syphon-shaped connecting tube into No. 2, and from thence to Nos. 3, 4, 5, and so on, becoming at every contact with a fresh bundle of cane more and more impregnated with saccharine matter, till at last in No. 6, it has almost attained the usual density of the ordinary cane-juice, and may now be advantageously sent forward for defecation and boiling. In the meantime the bundles in No. 1 are become thoroughly lixiviated. This vessel is now disconnected from the others, the liquor that is in it is let off into the common reservoir beneath, so as to be used again in case water is not to be had in plenty. Previous to this the cistern above has been put into connection with the vessel No. 2, so as to bring the hydraulic pressure to bear directly upon this latter. The worms before-mentioned as lying at the bottom of the vessels, are used to keep up in them an uniform temperature of 175° Fahrenheit (which, however, must not be exceeded). As soon now as the water has been let off from No. 1, and the bundles of cane have dripped nearly dry, the latter are taken out, dried in the air, and then sold or used as fuel in the usual way. No. 1 is now again filled with fresh bundles of cane, and after being closed down receives the liquor from No. 6, which in the meantime has become weaker. No. 2 is then emptied, and in this way a complete rotation is established.

In this deviation from the usual process of maceration we obviate a very principal objection, which is often put forward with good grounds—namely, we preserve uninjured the fuel that Nature has assigned us, and at the same time obtain nearly twice as much juice: for if, formerly, we were obliged to content ourselves with a produce of 50 per cent. of juice on an average, we may now reckon with certainty on 90 per cent., and of course on a corresponding produce of sugar without the cost of production having been increased in any degree worth mentioning. Any objection on the score of the quantity of water which would be required by this arrangement, I trust to be able subsequently to meet satisfactorily; since there is a well-founded prospect, that by the application of a new idea we shall be able to supply this want everywhere in a manner neither difficult nor expensive.

If I forbear on the present occasion to enter into the details of my second improvement connected with a process of filtration, it is that I am not as yet protected by a patent for the invention; and I can therefore, for the present, only state that I have a method, which is within the reach of every planter, for expediting filtration to such an extent that it may now be introduced on the largest scale. The gain that will accrue to the manufacture of sugar from this improvement will be self-evident to every one who is aware that the bad quality of colonial sugar proceeds mainly from the boiling up into sugar of juice which is unclear, and badly, or not at all, defecated, and consequently very liable to burn.

I have, in conclusion, to draw the attention of the Society to my improved process of evaporating sugar containing juices.

This stage of the manufacture of sugar is notoriously the weak point of colonial industry. The usual arrangements for boiling down the juice of the cane are so defective, and so opposed to all the experiences of science, that it is almost astonishing that anything approaching a decent result should ever have been attained. On the one side, the chief aim seems to be to consume as much fuel as possible; and on the other, it would be difficult to contrive any apparatus more calculated to injure the quality of the sugar.

For the last two years, I have been constantly occupied, in endeavouring to construct an evaporating apparatus more in conformity with the laws of science; to discover the form of an apparatus which should least injure the quality of the sugar, which should produce a saving in fuel, and the purchase of which should, at the same time, be within the pecuniary reach of the smaller planters. This problem I think I have perfectly solved in my invention of the *disc apparatus*. Before I proceed to describe it, I would take the liberty of drawing your attention to a remarkable discovery which I made in the course of my experiments with reference to this apparatus; and I will make no secret to you of the various modifications which my original idea was compelled to undergo before it arrived at the present state of feasibility.

My main object was originally to attain a rapid and violent evaporation by passing steam at a pressure of from 1 to 1½ atmospheres through a horizontal hollow screw, about five feet in length and three feet in diameter, formed of copper or sheet-iron, and kept in constant revolution; the steam being condensed in the last spiral of the screw and issuing therefrom in the shape of water. Whilst experimenting on an apparatus of this construction in my laboratory, I made the gratifying discovery alluded to above—that although the steam that was rushing through my hollow screw had a pressure of from 1 to 1½ atmospheres, the saccharine fluids that were now evaporating away at a great rate, notwithstanding their density (30° Beaumé), never reached a higher temperature than 175° Fahrenheit; so that any caramelisation of the sugar was totally out of the question, the syrup retaining at the same time the pale yellow colour of honey. I subsequently gave up this construction and replaced it with one still more to the purpose.

My new apparatus consists simply of a horizontal shaft, to which a large number of radial rods are screwed. These rods are provided at each end with hooks, to which round discs of coarse calico, linen, ticking, or, under some circumstances, wire gauze, are attached. It is self-evident that in this way, without incurring any great expense, and without loading the shaft too heavily, an enormous evaporating surface is procured, with this additional advantage—that from the simple and efficacious manner in which the evaporating surface is attached, it can be easily and without trouble renewed at any time. The evaporation is further expedited by a fan, or blower, in connection with the driving-shaft, which keeps this evaporating surface in constant motion. This fan forces a constant blast of air through an upright hollow screw which revolves inside the chimney. As the air, thus warmed and dried in the chimney, would be driven into the apparatus through the shaft, made hollow for the purpose, or through pipes laid along the side and provided with air-holes, it would take up moisture, and in this way contribute most powerfully to the drying of the discs (consisting as they do of light material), and materially expedite the evaporation of the fluid imbibed by them at every fresh revolution of the constantly revolving shaft. For the evaporation of the weak juice, two such machines should, according to my idea, be put up, one behind the other, which could be both heated from the same fire; whilst in close contiguity to the fire-place—that is, immediately over the fire, a smaller apparatus might be arranged, which, as being destined for the concentration of the syrup and the complete boiling down of the juice, would be provided with discs of wire-gauze.

There is no doubt that with this simple and anything but costly apparatus, the cleaning of which, moreover, is attended with no difficulty, an extraordinarily rapid evaporation of the juice would be effected without exposing it in the most remote degree to the danger of caramelisation.

In addition, I would remark that from reasons of science I must propose an important alteration in the clarificators, or defecating pans, in use in the colonies. They are for the most part so large (often containing as much as 500 gallons), that it frequently takes one or two hours to fill them. From this cause, a delay most injurious to the quality of the juice, and necessarily of the sugar, arises—a delay that must be obviated by the use of much smaller kettles, containing, say 100 to 150 gallons.

In the crystallisation of the sugar, also, the method of proceeding in the colonies is at variance with correct principles. To obtain a beautiful crystal, a sugar of a strong grain, one must use much larger crystallizing vessels. The vessel must be filled as rapidly as possible up to the brim with the fluid sugar, or with the liquor boiled down to the consistency of syrup, and then left undisturbed in a moderately warm place for at least three or four days. As soon as the crystallized mass is nearly cooled, it should be dug out, separated from the molasses by means of the centrifugal machine, and it then offers a beautiful, white, dry sugar, that may be shipped at once without giving rise, let the voyage be ever so long, to those losses which the merchant denominates leakage.

In conclusion, allow me to sum up those improvements in the manufacture of sugar, which I have either already brought into use, or am about to introduce:

They consist in:

1. The extraction of a larger produce of juice from the sugar-cane.
2. A more complete defecation of the juice by the use of the newly invented "Finings," known by the name of "Dr. Stollé's Arcanum."
3. An improved method of filtration.
4. A new process of evaporation.
5. A more complete system of crystallization.
6. An efficacious centrifugal machine, with alternate drums for rapidly separating the crystallised sugar from the mother liquor: and further,
7. My mash, or kneading apparatus, to be used preparatory to the centrifugal machine.

I hope and trust, that the above statement will go a great way towards convincing the Society of Arts, that I have endeavoured according to my powers, to contribute to the improvement of the manufacture of sugar in the Colonies, now so sadly in decay: and that I have indeed already been so fortunate as to pave the way for a great step in advance.

EDWARD STOLLÉ.

## NOTICE TO INSTITUTIONS.

General Sir Charles Pasley has forwarded to the Council, for gratuitous distribution to Institutions in Union, 100 copies of his work on Weights, Measures, and Coins. As the number is limited, those Institutions desirous of possessing copies are requested to apply immediately.

## LEGAL POSITION OF INSTITUTES.

The following statement has been put forth by the Committee of the Woodbridge Literary and Mechanics' Institution, regarding their non-liability to Parochial Rates:—

The Woodbridge Literary and Mechanics' Institution was established in the year 1836, for the following objects, as set forth in the original rules and regulations: the instruction of its members in the principles of the useful and ornamental Arts, by means of Classes, a Library, and the delivery of Lectures on the different branches of Literature, Science, and Art.

At its commencement, the Library and Class rooms of the Institution were in hired apartments, the rates of which were paid by the landlord of the premises. But in the year 1851 a Temperance and Lecture Hall having been built by a company of shareholders, the Committee of the Institution hired of the said shareholders four rooms, attached to the above-named Lecture Hall; for the purposes of a Library and Reading-room, Class-rooms, and as a Depository for Scientific apparatus, at an annual rental of 15*l.*

In April, 1852, a rate of 8*s.* was demanded by the Collector of the Poor Rate; which was *refused*, on the grounds of the non-liability of the premises; according to an act of Parliament passed in the year 1843, viz. 6 and 7 Vict., cap. 36, expressly made and provided for the exemption of societies devoted to the cultivation of "Literature, Science, or the Fine Arts," from Parochial dues, the preamble of which is as follows:

> "Whereas it is expedient that Societies established exclusively for purposes of Science, Literature, or the Fine Arts, should be exempt from the charge of County, Borough, Parochial, and other local Rates in respect of Lands and Buildings occupied by them for the Transaction of their Business, and for carrying into effect their purposes: be it therefore enacted," &c. "That from and after the first day of October, 1843, no Person or Persons shall be assessed or rated, or be liable to pay to any County, Borough, Parochial, or other local Rates or Cesses, in respect of any Land, Houses, or Buildings, or parts of Houses or Buildings, belonging to any Society instituted for Purposes of Science, Literature, or the Fine Arts exclusively, either as Tenant or as Owner, and occupied by it for the Transaction of its Business, and for carrying into effect its Purposes, provided that such Society shall be supported wholly or in part by annual voluntary Contributions, and shall not, and by its Laws may not, make any Dividend, Gift, Division, or Bonus in money, unto, or between, any of its Members, and provided also that such Society shall obtain the Certificate of the Barrister at Law or Lord Advocate, as hereinafter mentioned."

Upon the refusal of the Committee under these provisions of the Act to pay the rate, a summons was issued against the Institution; and on the 21st of April following, the case was heard before the Justices of the Peace in the Town Hall, at Petty Sessions; Mr. James Barritt being defendant in the case. Mr. George Moor, solicitor, attended on behalf of the Institution, claiming exemption rom the said rate, according to the provisions of the said Act of Parliament 6 and 7 Vict., cap. 36, above quoted, and having produced the Act, together with the certificate of John Tidd Pratt, Esq., the Revising Barrister, appointed under its provisions, succeeded in showing that the conditions of the said Act were fully complied with. On the other side, the Magistrates' deputy clerk referred to some recent decisions of the higher Courts, where certain societies had not been allowed the benefit of this Act. The Magistrates, however, did not consider the quoted cases applicable to the one in question; and after having carefully perused the Rules of the Institution, the Act of Parliament referred to, and also the certificate of the Revising Barrister, and having put various questions to the defendant, in relation to the objects and management of the Society, were unanimously of opinion that the rate attempted to be levied could not be sustained, and dismissed the case.

According to the provisions of the Act of Parliament, the parish officers had the power of appeal to the Quarter Sessions, for the Act in the sixth clause clearly stated such to be the legal course of procedure.

### CLAUSE VI.

> "Provided also and be it enacted, that any person or persons assessed to any rate from which any society may be exempted by this Act, may appeal from the decision of the said Barrister or Lord Advocate in granting such certificate as aforesaid to the said Court of Quarter Sessions, within four calendar months next after the assessment of such rate, and after such certificate shall have been filed as aforesaid within four calendar months next after the first assessment of such rate, made after exemption shall have been claimed by such society. Such appellant first giving to the Clerk or Secretary of the Society in question twenty-one days previously to the sitting of the said Court notice in writing of his intention to bring such appeal, together with a statement in writing of the grounds thereof, and within four days after such notice, entering into a recognizance before some Justice, with two sufficient sureties to try such appeal at, and abide the order of and pay such costs as shall be awarded by the Recorder or Justices at such Quarter Sessions: and at such Quarter Sessions such Recorder or Justices shall on its being proved that such notice and statement have been given as aforesaid, proceed to hear such appeal according to the grounds set forth in such statement, and not otherwise; and if the certificate of the said Barrister shall appear to him or them to have been granted contrary to the provisions of this Act, shall and may annul the same, and shall and may, according to their discretion, award such costs to the party appealing or appealed against, as he or they shall think proper, and his or their determination concerning the premises shall be conclusive and binding on all the parties to all intents and purposes whatsoever."

No appeal however was made according to the above-quoted provisions of the Act, and the matter was considered as *finally settled;* but on the 21st of April of the present year, some discussion having been raised by an anonymous writer respecting the liability to seizure of a portrait of George Thomas, Esq., the President of the Institution, about to be placed in the Lecture Hall, the question thus seemingly decided and set at rest, was opened in a spirit of controversy, and the defendant in the former case received notice that the subject of the rating of the Institution would be again brought forward, with a view to enforce payment of the rate that had been disallowed by the Magistrates, as well as other rates said to have accumulated from January, 1852. The defendant accordingly attended at the vestry, for the purpose of pleading the decision of the Magistrates, and was fully prepared to enter into the merits of the case, and wishing the parishioners to be thoroughly informed on the subject, the services of the same legal gentleman were engaged who had conducted the case before the Magistrates. But the senior churchwarden, who was chairman of the vestry, would not suffer the decision of the Magistrates to be pleaded, nor the case to be properly considered, and peremptorily ordered the rate to be enforced.

Having thus been prevented from pleading their cause in the vestry, the Committee of the Institution thought it expedient to lay the whole case before their members; and that the ratepayers also, who were not members of the Institution, might be made acquainted with its merits, they were invited to attend a public meeting, in which the matter might be fully discussed, and the proceedings of the Committee condemned or justified.

A public meeting of the members of the Institution and the rate-payers of the parish was accordingly held in the New Lecture Hall, on the 5th of May, 1853, William Martin, Esq., in the chair. At this meeting.

which was numerously attended, a statement was produced in justification of the course taken by the Society in reference to the rate in question; several members of the Committee offered explanations as regarded particular points of the case; the Act of Parliament under which the Society claimed exemption was read, with the certificate of John Tidd Pratt, Esq., the revising Barrister appointed by Government; it was also stated that there were upwards of two hundred similar Institutions at the present time exempt from rates under this Act; and the meeting was unanimously of opinion that it was wrong to endeavour to circumscribe the usefulness of an Institution of so much benefit to the town, by frivolous and vexatious pleas, and passed a resolution *nem. con.*, "That the Committee of the Institution were fully justified in resisting the infliction of the rate."

On the following day, Mr. George Moor, on the part of the Institution, appeared before the Magistrates in Petty Sessions, to show cause why the rates had not been paid; Mr. Moor especially urged the Sixth clause of the Act of Parliament already quoted, on the consideration of the Magistrates. He argued that in this Society the cultivation of Literature, Science, and the Fine Arts, were primary objects; that the Rules contained a law *against* dividends; that there was an absence of dividends between its members; that the Institution was supported entirely by voluntary contributions; that the Barrister's Certificate had been obtained; that all essential conditions to the right of exemption were fully complied with; and that if any person or persons, official or otherwise, were not satisfied with the Barrister's Certificate, they had the power of appeal to the Quarter Sessions within a given time. This they had omitted doing; he therefore considered his client was by this Act justly entitled to exemption.

The Solicitor on the part of the parish then addressed the Magistrates in support of the rate, and stated "That as the several rates had been duly made and allowed, and the defendant had not appealed against them, there remained only to enforce their payment, and for this purpose the Justices of the Petty Sessions were only ministerial and had no discretion or jurisdiction over the merits of the case, and supported his argument by citing the case Birmingham (Churchwardens of) *v.* Shaw, in which case a rule was made absolute under 11 & 12 Vict. c. 44, sec. 5." In this case the Court of Queen's Bench, although of opinion that the rates levied and not appealed against must be paid, decided that the Institution at Birmingham was as to subsequent rates altogether exempt. There is a strong similarity between this case and that of the Woodbridge Institution; the latter, however, being still more within the spirit and meaning of the Act, and the claim of exemption therein contained. Under all the circumstances, the Magistrates said they had no alternative but to issue their distress warrant for five rates, amounting to 2*l.* 18*s.* and 11*s.* 6*d.* court fees, which were subsequently paid.

By the course thus adopted, it will be seen that the Act of Parliament so far from being a benefit to Literary Societies, may be made an instrument for involving them in the intricate meshes of the Law, and imposing on them heavy expenses whenever the parish officers of a town may think proper to oppose its liberal provisions: and when no funds are at hand to meet litigious demands, the holders of a "little brief authority" may destroy such Societies altogether. The appeal to the Quarter Sessions will entail considerable expense; and as the parish officers may carry the case (if decided against them), to the Court of Queen's Bench, at a further cost; the Society having no means in hand to meet such accumulated liabilities, must either comply with an unjust requirement, or appeal to the friends of human improvement to enable them to resist the illegal demands made upon them.

## DISTRIBUTION OF HONOURS AT THE LIVERPOOL COLLEGIATE INSTITUTION.

The annual distribution of prizes and certificates took place in the theatre of this institution on Wednesday, the Earl of Harrowby presiding. Surrounding his lordship on the platform were observed his Worship the Mayor, Samuel Holme, Esq.; the Revs. Rector Campbell, Fielding Ould, J. Cordeaux, Dr. M'Neile, Dr. Hume, F. Amos, J. H. Jones, C. Lawrence, A. S. Farrar, and Dr. Jackson, late Principal of the Training College at Battersea; Messrs. Edmund Molyneux, W. Gregson, Edward Cropper, Francis Shand, George Hall Lawrence, Josias Booker, James Tyrer, R. Aked, J. K. Rounthwaite, D. Douglas, T. D. Anderson, J. G. Morris, A. Hodgson, C. Inman, J. Cooper, J. Rawdon, J. Nicholson, E. Jones, &c., &c.

The pupils were assembled in the body of the theatre while the galleries were crowded by ladies.

The noble CHAIRMAN, in opening the proceedings said that he had the honour of being numbered amongst those who contributed to the foundation of that great Institution. He was one of the office-bearers, but the office hitherto with him had been merely an honour, and it was to discharge in some measure the duties attached to that honour that, in compliance with the wishes of the Principal, he was present on that occasion. A few years ago it would have been a physical impossibility for him to have done this; but, in the interval which had elapsed, physical impossibilities had almost disappeared, and nothing but moral ones remained. He might have felt it almost a moral impossibility to have come down, from the occupations of political and social life in London, to this distant part of the country, if it had not been that, for the last few weeks, his thoughts had been specially directed into the very channel in which they would naturally flow in connection with that institution. They had been engaged in London in considering if they could not do something towards giving a better commercial education to the great metropolis. Meetings had been held for the purpose, but they found it rather a difficult thing to put that great inert mass, called the metropolis, in motion. It was a body so vast that it was difficult to throw any spirit into it which should permeate the remoter parts of the system. They had there, if they could, to build upon a foundation of the reign of Queen Elizabeth, well known to men of science as Gresham College. At one time it was the centre of science; the germ, he believed, of the Royal Society; but, like many other old Institutions, it was no longer adapted, in its ancient form, to the wants of the age, and had therefore become a perfect nullity. They wished, then, if they could, to throw a little life into this old dead body. At Liverpool this difficulty was not experienced. Liverpool had no very old foundations; it was a living body throwing out daily fresh emanations of its active organisation; and amongst the most distinguished perhaps—one certainly around which his own feelings had ever centred—was the Collegiate Institution. He looked at it with peculiar interest, as combining an education for every class of society—mixing without confusing, raising without lowering. He had looked at it with peculiar interest also as connected with their own Church; and although he had no feelings of intolerance towards other churches, he might be forgiven if he had a special partiality towards the church of his own belief. Now, it naturally occurred, was not this very Institution doing the work which, in London, they were so desirous of seeing effected—furnishing to the commercial classes of this great community that very education which was so much desired in the metropolis? He believed to a great extent it did; but he believed it might still be enlarged and developed for that purpose, particularly in regard to those physical sciences which prepared men for the concerns of active practical life. He was glad to find that this idea was not a new one here, and he hoped that as, generally speaking, an idea was not long in striking root in Liverpool,—since, unlike so vast a body as London, the people were accustomed to act together for a common purpose—that it would take root and flourish. He was happy to find, by the reports which he had received from various quarters, that the Collegiate Institution was doing an increasingly good work in the matter of educating the various classes of this great community. It shut out none, and encouraged every one; and, in the link which it thus formed between the highest and the lowest, it carried out the great idea of our general constitution, which was order without confusion, together with encouragement to aspiration. It was almost a peculiar advantage of our community that we combined these objects. On the Continent there was generally order, but no encouragement to rise, while in other countries there was rather a confusion of classes; all were encouraged to rise, but there was no very great order. We, on the contrary, combined the two to a very great extent. In our community no one was jealous of those above him, but anxious, at the same time, to be ranked among them—desirous to rise, with a view to better himself, rather than to pull down others to his own level. At the Collegiate Institution they were working precisely in that way, giving to all an education which was advantageous to persons in their several degrees, and giving to all an opportunity of rising to another degree, if their own peculiar genius led them to aspire. He had before him evidence of the root which the Institution had taken in their community. He had before him the prizes which had been earned: and it would be his pleasure to take part in the distribution of prizes so well earned, and for the good of a community so distinguished. This was not a little narrow community living within itself. There was not a lad there who had not an opportunity of placing himself in a position to exercise an influence far beyond the town itself. There was not a lad there who might not go far away to distant lands, and carry with him there the benefits of that education he received here. But he hoped that whether the pupils remained at home or abroad, they would be the missionaries of civilization and religion.

The Principal of the Institution, the Rev. J. S. Howson, then rose, and thanked Lord Harrowby for having come so far at so busy a time to preside on this occasion, and expressed his conviction that by so doing he would confer a great and lasting benefit on the schools. After alluding to some kind inquiries by the Archbishop of Canterbury, at one of the recent educational conferences in London, and expressing the pleasure which all felt in seeing Mr. Farrar, who had won the first M'Neile exhibition, returning in the character of examiner after a distinguished career at Oxford, Mr. Howson called up Bishop to receive the University exhibition. Rawdon was called up along with him, in consequence of having been nearly equal in the examination.

The Earl of Harrowby said it did not become him to say anything while the founder was present, and he called on Dr. M'Neile, who addressed to the boys some words of friendly advice, in the course of which he adverted to the recent honours obtained at the Universities by pupils of this Institution; Farrar having won the prise for a theological essay at Oxford, Rigby being in the first class at Trinity College, Cambridge, Percival being first of his year in classics at Emmanuel College, and Whiteside first in mathematics at Catherine Hall, each of the two latter gentlemen having obtained a scholarship.

Mr. Farrar then spoke with much feeling of the time when he was himself elected to the Exhibition eight years ago, and pronounced a highly favourable judgment on the boys whom he had just examined, stating that some of their papers were quite equal to what would have been produced by young men at Oxford.

Those who had won prizes were then summoned to the platform by the Principal, in successive groups, and the Chairman addressed a few kind and appropriate words to each.

The whole of the prizes having been distributed,

The Mayor proposed a vote of thanks to the noble chairman for his services during the day. For a period of sixteen years the noble lord represented the borough with an ability seldom if ever exceeded, and with an unceasing attention to their interests. He was about to proceed to the Exchange, where he knew a cordial reception awaited him, but he was sure that he would receive as cordial a welcome there, for the manner in which he had delivered the prizes, and the Christian sentiments he had uttered. Indebted to him as they were for coming down to Liverpool at a period when he was engaged in parliamentary business, he was sure they would agree with him "that the best thanks of this meeting be presented to the Earl of Harrowby for his kindness in presiding on this occasion."

The Rev. Rector Campbell seconded the motion, which was carried unanimously.

The Earl of Harrowby, in responding, said:—Ladies and gentlemen, and young friends, I am not unused to be kindly received in Liverpool; and my recollections of those exciting times, I assure you, are unmingled with regret. I made active exertions in what I considered a just cause. On the present occasion I have cause to feel still more gratification. I have only to add a parting word. Recollect you all belong to a great country. It is indeed noble, and a noble part of it is Liverpool, to which you belong. If England were blotted out from the globe, where would be the civilisation of the world? Where would be the means of propagating religion? Blot out from England Liverpool, and where would England be? Where would be her manufactures, her industry, and her energy? Recollect that you have the position of citizens of a great community in a great nation, and consider you are always growing up to fill a noble position; and recollect, therefore, you have a great work to do. And remember, my young friends, that whatever you undertake to do, prosecute it with energy, and you will accomplish it. And now let me bid you farewell; hoping you will continue to prosecute those efforts you have begun so well, that you will continue to make your name known not only in this community, but everywhere; and that you will still endeavour to make the name of the Liverpool Collegiate Institution a name of honour among the great educational establishments of this nation. The noble Lord then sat down amidst considerable applause.

The Rev. Rector Campbell proposed, and Dr. M'Neile seconded, a vote of thanks to the Mayor.

## ACCOUNT OF THE QUANTITY OF ENGLISH PRINTED BOOKS EXPORTED ON DRAWBACK, WITH THE RATE AND AMOUNT OF DRAWBACK PAID THEREON, IN EACH OF THE YEARS 1850, 1851, AND 1852.

| Years. | Poundsweight of printed books exported | Rate of Drawback. | Amount of Drawback paid. £ | s. | d. |
|---|---|---|---|---|---|
| 1850 | 961,536 | 1½*d*. per lb. and 5 per cent. | 6,310 | 1 | 7 |
| 1851 | 1,147,138 | ,, | 7,528 | 1 | 10½ |
| 1852 | 1,247,843 | ,, | 8,188 | 19 | 4½ |

## WEIGHTS AND MEASURES.

Professor Jack, of Fredericton, New Brunswick, has addressed the following remarks to the Editor of the *Athenæum*, in reference to his paper on this subject, which was read before the Society on the 23rd of February, and reported in No. 14 of the Journal:

"I wish to mention," says the writer, "that the paper was of a very unpretending character, and was prepared by me in the spring of 1852 with the intention of being read before a very small association of gentlemen in this place. In the autumn of the same year, I perceived that the Society of Arts had formed a Colonial Committee, one of whose objects, as stated in an inclosure sent through the Colonial Office to the Lieut.-Governor of New Brunswick, is, 'To make a comparison of coins, weights, and measures, as used in the Colonies, and to receive and discuss propositions for giving them uniformity.' Having, therefore, the paper lying by me, I forwarded it, just as it was, thinking that one part of it might furnish some such information as was desired; but not at all supposing that it would be deemed worth reading before a formal meeting of such a body as the Society of Arts. I beg, however, to call your attention to a point which I regard as somewhat important and deserving of further consideration; namely, the way in which I proposed to reduce our confused, perplexing, and incongruous tables of weights to one which would, nevertheless, include all the most essential denominations in each, and moreover be framed in a great measure according to the decimal scale. In Troy weight it is necessary to preserve the *grain*, or some simple multiple or sub-multiple of it. The other denominations are much less frequently used, and can all be readily reduced to grains when needed. In Avoirdupois weight the pound can not be dispensed with; and although the ounce is employed to a considerable extent in the retail trade, yet it is desirable on several accounts to abolish it; and to accomplish this would, I conceive, be neither very difficult nor hazardous. The following is the decimal scale suggested:

| Grains. | Millozes. | Centoze. | Secoze. | Oze. | Pound. | Stone. | Sekone. | Hectone. | Kilone. |
|---|---|---|---|---|---|---|---|---|---|
| 5 | 10 | 1 | | | | | | | |
| 50 | 100 | 10 | 1 | | | | | | |
| 500 | 1000 | 100 | 10 | 1 | | | | | |
| 7000 | 14000 | 1400 | 140 | 14 | 1 | | | | |
| 98000 | 196000 | 19600 | 1960 | 196 | 14 | 1 | | | |
| 980000 | 1960000 | 196000 | 19600 | 1960 | 140 | 10 | 1 | | |
| 9800000 | 19600000 | 1960000 | 196000 | 19600 | 1400 | 100 | 10 | 1 | |
| 98000000 | 196000000 | 19600000 | 1960000 | 196000 | 14000 | 1000 | 100 | 10 | 1 |

In the table of long measure I have ventured to propose the *foot* instead of the *yard*, as recommended by the Commissioners in their Report of 1841, for the basis from which to proceed decimally,—inasmuch as a decimal multiple and sub-multiple of the former are in common use, more especially among engineers. In this colony the measures of capacity are in a most unsatisfactory state; but a Bill for regulating all weights and measures has been proposed for the consideration of the Provincial Legislature during their present session, and I think it will receive their sanction. My own prepossessions are strongly in favour of adopting the Imperial measures; but I am obliged reluctantly to confess that it would be injudicious to attempt their introduction here, principally for the following reasons:—1. Because the old measures are retained in all the British colonies in North America, and in the West Indies, as also in the neighbouring States of the Union. 2. Because all the liquid measures now in universal use throughout the colony would have to be replaced by the Imperial, at no inconsiderable expense; and many old customs and habits would consequently be interfered with. The needless and mischievous distinction between liquid and dry capacity will be rendered less objectionable by a clause in the Bill which orders that all grains, roots, &c., herebefore sold by stricken or heaped measure shall henceforth be sold by weight, and that so many pounds of such articles, specially named, shall be deemed and taken to be a bushel."

## HOME CORRESPONDENCE.

### LEGAL POSITION OF INSTITUTES.

*Mechanics' Institution, Leeds, June* 22, 1853.

Sir,—In the Report of the Meeting on the 9th instant, *item*, "Legal Position," I am reported to have said, "they (*i. e.* Institutions), were very well contented with the Act as it stood; they could take care of their property very well, if they were exempted from rates."

As this sadly misrepresents my words and intention, though perhaps it was unavoidable in the necessary curtailment of my remarks, permit me to say, that desiring to show that the exemption from rates was of much more importance to, and more highly prized by most Institutions than any prospective advantages from the acquisition of a legal position, that I believed if they were polled, they would be disposed to say, we can take care of our property if you will only give us exemption from rates. I did not enforce the importance of pressing for an Act to give a legal standing, with such functions of Corporate Associations as may be requisite for securing the property of Institutions against malversation from within, and pillage from without, although a subject of vital interest to this Institution, because I saw that Mr. Chester, the Chairman, and other gentlemen, representing the Society of Arts, were quite alive to the necessity of procuring a legal recognition for Institutions.

Yours, &c.

W. H. J. Traice.

## CHRONOMETERS.

SIR,—I do not think Mr. Loseby will establish the superiority of his compensation balance by publishing fabulous accounts of what took place in the Exhibition of 1851.

Wherever he got it from, there is not a word of truth in his story (and it would be nothing to the purpose if there was), that "the Council Medal which Baron Seguier and Professor Colladon recommended should be awarded for his improvements in horology was not passed [by the Council of Chairmen, of course he means] owing to the opposition of Mr. Denison, who being the Chairman [of the Jury] was the only person in the class entitled to vote [in the Council.]"

So far from my vote, as the sole representative of the Jury, being the obstacle to his success before the Council of Chairmen, his supposed advocate Baron Seguier was allowed to attend that meeting for the express purpose, and by my express consent (the only instance of the kind in all the thirty-four juries), of proposing, in opposition to me, some further council medals besides those which had been regularly sent up by a majority of the jury. One of those proposals he carried, and only lost another by a few votes; and, as Mr. Loseby is rightly informed, he also proposed a council medal for Mr. Frodsham, which was very deservedly negatived by nearly the largest majority which occurred at any meeting of the Council.

Mr. Loseby had been one of eleven exhibitors whose claims to a council medal had been discussed in the jury; but Baron Seguier, I beg to inform him, did not propose him at all to the Council of Chairmen, though I had gone out of the usual course to give him an opportunity of doing so if he thought proper. If he had, I should undoubtedly have opposed it, on the same grounds on which the Astronomer Royal, not once, nor twice, but in three different years, reported against Mr. Loseby's claim to be distinguished by a special reward from all the other inventors of secondary compensations.

All that, moreover, is independent of the much better means which we now have of appreciating the futility of his claim, by that analysis of the Greenwich lists (including two more years of trial than were then published), which he flatters himself he has refuted by that singularly absurd objection, that in the eight coldest and the eight hottest weeks of trial, there occur several weeks of moderate and not extreme temperature.

That is just as absurd as if you were to say, there is no occasion to provide against your water-pipes freezing in the two coldest months of the year, because the average temperature of those months is above freezing point. Mr. Loseby knows perfectly well that on every day of extreme temperature in those eight coldest or hottest weeks, the secondary compensations have to do their work—or betray their defects, although the next day, or the next week, may be all of moderate temperature, which requires no secondary compensation at all.

However, as he complains of my assigning to the two extreme temperatures some weeks which ought to be placed in the mean temperature period, let him try a mean temperature period equal to both the extremes together, by taking twelve weeks for it instead of eight, and thereby increase the intensity of each of the extreme periods; and he will then have the satisfaction of finding that such a division exhibits his chronometers as still more decidedly beaten by Mr. Dent's, than the former division into equal periods, which he objected to.

I shall now take leave of Mr. Loseby, with the advice, whenever he brings forward his next invention, to be a little more sure of his ground before he pronounces that "nothing has succeeded in establishing a claim to the title of being an improvement since the last century," except what he has himself produced.

I remain, yours faithfully,
E. B. DENISON.

## LOCKS.

SIR,—I observe in last week's Journal a letter from Mr. Hobbs, on the subject of Mr. Saxby's lock, recently rewarded by the Society, which I think needs a few words of explanation and reply, as your acute correspondent appears to be somewhat in error as to the circumstances of the case.

The remarks of Mr. Hobbs appear to amount to this; first, that Saxby's lock is not new, the principle being the same as the Yale lock, and as Cotterill's lock; secondly, that it is not very secure, because he picked it.

Now, unquestionably, Saxby's lock is constructed on the same general principle as Cotterill's and Yale's, and both of them in turn are derived from the Bramah: but this does not prove the locks to be the same; and if Saxby, by ever so slight a modification, produced a lock for half a crown as good as Cotterill's lock for ten shillings, then Saxby certainly deserved the Society's prize.

In seeking for a "cheap and very secure lock," it is evident that the Society desired a good common lock—one which could be made and sold for a few shillings, and yet be much more secure than the locks commonly to be had for such a price, which in fact are too often no locks at all, being easily opened and locked again with a bit of wire or a bent nail.

The term "great security," as set forth in the prize list, meant, I imagine, great security against the attempts of the idle and the mischievous; but it certainly never aspired to defy the systematic ingenuity of a professional lock-picker like Mr. Hobbs. The great security of the store-room or apple-loft is not to be compared with that of the banker's safe or deed-box; and a lock intended for the former, and perfectly secure against all trials to which it might be put, would no doubt be set aside as valueless for the latter.

I think that no one expected, as the result of the Society's premium, an unpickable banker's safe lock for five shillings.

Whether Mr. Saxby's lock is quite new in principle, or whether it is in fact merely a modification of some older lock, is not the question; neither is it important to inquire in how many minutes Mr. Hobbs picked the lock. The real point is, that Saxby's lock is much more secure than *common* locks are, and that it costs much less than really good locks commonly do.

I am, Sir, yours faithfully,
P. L. O.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

## MISCELLANEA.

SEWING BY MACHINERY.—A machine, of American invention, has been introduced into this country by Mr. Darling, of Glasgow (at whose manufactory numerous examples of it are now in operation), which carries the mechanical principle into a fresh department of human labour—namely, that of common hand-sewing. The machine is extremely simple in construction. Its framework is of cast-metal, and it occupies little more space than two cubic feet. The right hand of the worker turns a small wheel, which puts in operation two needles,—one an upright needle, the other a sort of semicircular one; and on a strong tabular surface, at the left-hand extremity of which these two needles work—the upright above and the circular under—the cloth is laid with the left hand, and propelled between the needles as the machine proceeds with its stitching. It is said that the machinery is not liable to become deranged, and that any breakage of the thread can be rectified with very little loss of time. The machine can be driven by the foot, after the manner of a turning-lathe, and in this way the rate of work by hand, which is 500 stitches per minute, would be doubled.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 23rd June*, 1853.

583. Tobacco, &c.—Returns.
584. Coals, Cinders, and Culm—Account.
599. Maynooth College—Return.
628. Bills—Seamen's Savings Bank.
636. „ —Customs Duties on Spirits (as amended in Committee, and on re-commitment.)
638. „ Dublin Parliamentary Registration.

*Delivered on 24th June.*

588. Durham Election—Report from Committee.
619. Turnpike Trusts—Return.
648. Sattarah (Receipts and Charges)—Return.
568. River Tyne Return—(a corrected copy.)
639. Bill—Public Libraries (Ireland).

*Delivered on 25th and 27th June.*

605. Isle of Man—Copy of Letter.
620. Government Stocks—Return.
656. Succession Duty Bill—Copy of Mr. Finlaison's Letter.
603. Police—First Report from Committee.
110. Civil Service Superannuations—Return.
501 (1). Isle of Man (Moneys voted by Parliament)—Return.
541. Metropolitan Commission of Sewers—Return.
576. Ecclesiastical Commission—Return.
622. Westminster Bridge Bill—Minutes of Evidence.
618. Unstamped Publications—Return.
569. Peterborough Election—Minutes of Evidence.
642. Bills—Episcopal and Capitular Estates.
654. „ —Newspaper Stamp Duties.
655. „ —Edinburgh and Canongate Annuity-tax Abolition.
644. „ —Stamp Duties.
Cape of Good Hope (Orange River Territory)—Further Correspondence.
Prevalence of Disease at Croydon—Reports by Dr. Arnott and T. Page, Esq.

*Delivered on 28th June.*

545. Madras Railway Company—Correspondence.
662. Isle of Man Customs Duties—Copy of Treasury, &c.
Charitable Donations and Bequests (Ireland)—Eighth Annual Report of the Commissioners.
Poor-Laws (Ireland)—Sixth Annual Report of the Commissioners.
Arterial Drainage in Ireland—Report and Appendices.

*Delivered on 29th June.*

596. Durham Election—Minutes of Evidence.
665. Bills—Brecon Collegiate Church (as amended by the Select Committee.)
651 „ —Parish Constables (ditto, ditto.)

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 24th June*, 1853.

*Dated 2nd April*, 1853.

786. Sir J. C. Anderson—Locomotive engines.

*Dated 18th April.*

934. H. W. Allen—"Vestal furnace," for carbonization of peat, &c.

*Dated 28th May.*

1321. E. D. De Boussois—Preventing incrustation of steam-boilers.

*Dated 30th May.*

1325. J. Brown—Elastic spring-beds, mattrasses, cushions, &c

*Dated 6th June.*

1390. F. Lott—Cartridges.
1392. D. Barker—Manufacture of blinds, shades, &c., from glass, &c., and also raising, lowering, folding, &c., such blinds, &c.

*Dated 9th June.*

1405. G. Bott—Method of preventing collisions on railways.
1406. H. B. Barlow—Machinery for spinning, doubling, and twisting cotton, &c. (A communication.)
1407. G. W. Garrood—Propelling vessels.
1409. C. Arnoux—New system of towing and traction.
1410. W. Muir—Improvements in turning-lathes, partly applicable to other purposes.
1411. J. Smith—Machinery for preparing and spinning wool, hair, silk, flax, &c.
1412. J. Smith—Combing wool, &c.
1413. E. Maniere—Manufacture of paper.
1414. W. Brookes—Treating fabrics suitable for floor-cloths, covers, &c. (A communication.)
1415. W. Brooks—Manufacture of boxes and other hollow receptacles.
1416. J. R. Napier and W. J. M. Rankine—Engines for developing mechanical power by action of heat on air, &c.

*Dated 10th June.*

1417. A. Chasneau—New method of obtaining steam power.
1419. J. Moore—Improvements in respirators.
1420. S. Frankham—Construction of coupling-joint applicable to pipes, vessels, &c.
1421. A. V. Newton—Spinning-machinery. (A communication.)
1422. R. A. Brooman—Manufacture of paper.
1423. J. Westwood and R. Baillie—Construction of iron ships.

*Dated 11th June.*

1424. C. Nickels—Manufacture of carpets and other piled fabrics.
1425. C. Binks—Improvements in dryers and in preparing drying oils for paints, varnishes, &c.

*Dated 13th June.*

1426. H. O'Connor—Digging by horse power.
1427. W. H. Smith—Permanent way of railways.
1428. W. Smith—Mode of manufacturing metallic handles for knives, forks, backs for razors, bows of scissors, &c.
1429. J. and T., and J. and W. Marsh—Fastening handles of table-knives and forks.
1430. J. Spencer—Improved cupels.
1431. T. J. Perry—Raising and lowering Venetian and other blinds and other bodies.
1433. W. D. Paine and G. A. Paine—Construction of steam-boilers and steam-boiler furnaces.
1435. R. Hopkins—Machinery for cutting and shaping cork, wood, &c.
1436. J. Webb—Obtaining motive power.

*Dated 14th June.*

1437. W. G. Craig—Axle-boxes, guides, and bearings of locomotive engines and carriages, partly applicable to bushes and bearings of machinery.
1438. R. W. Sievier—Improvements in looms for weaving.
1439. J. H. Penny and T. B. Rogers—Constructing machinery for propelling vessels, termed a "crank propeller."
1440. J. H. Johnson—Improvements in railway breaks. (A communication.)
1441. T. Richardson—Manufacture of certain salts of magnesia and a red colouring matter.
1442. J. L. Talabot and J. D. M. Stirling—Manufacture of iron.
1443. A. V. Newton—Mode of manufacturing cast steel. (A communication.)

*Dated 15th June.*

1444. G. Burstall—Bleaching oils and fats, and machinery for same.
1446. T. Butterworth—Machine for ploughing, harrowing, and clod-crushing at one operation.
1448. A. Robertson—Cases for storing and preserving edible substances.
1450. J. Macintosh—Portable boats or vessels and buoys.
1452. J. Dehan—Manufacture of woven fabrics, yarn, cordings, ropes, paper, and pasteboard, from a material not hitherto used in Great Britain for such purposes.
1454. J. J. Payne—Improvements in axles.
1456. J. Elliott and J. Brown—Machinery for making rivets, spikes, and screwblanks.

*Dated 16th June.*

1458. W. Baddeley—Improved label-damper.
1460. W. H. G. Field—Construction of barges and vessels, and means of steering.
1462. J. Blair—Improved mode of cutting lappet-cloths, and similar fabrics.
1466. R. A. Brooman—Machinery for sawing stone and marble. (A communication.)
1470. Dr. R. M. Glover—Production of chlorine, and manufacture of black oxide of manganese.
1472. J. Warren—Improvements in ploughs.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 24th June, 1853.*

Year, 1852:

1158. William Ramsell, of Deptford—Improvements in boilers for generating steam and hot air together or separately.
1165. William Tuer, William Hodgson, and Robert Hall, of Bury, Lancashire—Improvements in the manufacture of textile fabrics, and in machinery or apparatus for weaving, part of which is also applicable to machinery for preparing textile materials.

Year, 1853:

147. William Williams, of Eccleshall—Improvements in refrigerating apparatus.
252. Edwin Pugh, of Whitstable, Kent—Improvements in the means of ballasting ships and vessels, and in rendering them buoyant under certain circumstances.
316. Richard Prosser, of 18, Broad-street, Birmingham—Improvements in the construction of printing-rollers used in machines for printing calicoes and other substances.
447. John Charles Pearce, of Bowling Iron Works, near Bradford, Yorkshire—Improvements in steam-boilers.
460. Samuel Cunliffe Lister, of Bradford, Yorkshire—Improvements in treating soap-suds.
721. William M'Naught, of Rochdale, Lancashire—Improvements in steam-engines.
858. Adolphe Marius Alexander Inglesia, of Russell-place, Fitzroy-square—Improvements in producing ornamental glass surfaces.
984. James Napier, of Partick, Lanarkshire—Improvements in separating certain metals from their ores and alloys, and for obtaining certain products therefrom.
1003. Uriah Scott, of 155, Grove-street, Camden Town—Improvements in the manufacture of tubular rods and rings for furniture.
1061. George Murton and William Hatton Langshawe, of Eagley Mills, near Bolton, Lancashire—Improvements in stretching, dressing, and finishing cotton and linen yarns or threads, and in the machinery or apparatus connected therewith.

*Sealed 28th June, 1853.*

Year, 1852:

1173. James Darling, of Manchester, and Henry Spencer, of Rochdale—Improvements in machinery or apparatus for preparing and spinning cotton and other fibrous substances.
1174. William Beckett Johnson, of Manchester—Improvements in steam-boilers and in apparatus connected therewith.
1175. Pierre Francois Giraud, of Paris—Invention of an apparatus for the interior of bonnets, to fix them on the head.
1177. Edward Mucklow, of Bury, Lancashire—Improvements in the construction of retorts for the manufacture of pyroligneous acid, or for other purposes of destructive distillation.
1178. Edward Mucklow, of Bury, Lancashire—Improvements in machinery or apparatus for cutting or rasping dyewoods.

Year, 1853:

7. Joseph Brough, of Longton—Invention of a new manufacture of a vitrified substance, and its application, alone or in combination with mineral, earthy, and plastic substances, to various useful purposes in the arts, and certain other new applications of known plastic substances.
10. David Hulett, of High Holborn—Improvements in the manufacture of ornaments for lamps, chandeliers, and architectural purposes.
16. Edward Clarence Shepard, of Duke-street, Westminster—Improvements in the manufacture of gas.
23. Gustave Paul de L'Huynes, of 21, Frith-street, Soho-square—Improvements in medical portative electro-galvanic apparatus.
26. Francis Edwards, of 26, Park-place, Toxteth-park, near Liverpool—Improvements in the method of lettering, figuring, and ornamenting the surface of enamel used for dials and other purposes.
42. William Sykes Ward, of Leeds—Invention of a thermostat, or apparatus for the regulation of temperature and of ventilation.
43. William Watson, of Leeds—Improvements in apparatus for the manufacturing of prussiate of potash.
55. John Abraham, of Birmingham—Invention of a new or improved method of manufacturing percussion-caps.
120. John Thornborrow Manifold and Charles Spencer Lowndes, of Liverpool—Improvements in steam-engines.
481. Antonio Fedele Cossuo, of University-street—Improvements in filters.
957. Sir William Snow Harris, of Plymouth—Improvements in lightning-conductors for ships and vessels.
1027. Alfred George Anderson and John Barker Anderson, of Great Suffolk-street, Southwark—Improvements in the treatment of certain saponaceous compounds obtained in the manufacture of soap.
1036. Thomas Revis, of Stockwell—Improved single seed drilling or dribbling machinery.
1048. John Kealy, of Oxford-street—Improvements in machinery for mowing.
1073. Robert Walter Swinburne, of South Shields—Improvements in the manufacture of glass.
1081. William Edward Newton, of 66, Chancery-lane—Improvements in hot-air furnaces for heating buildings, some of which improvements are applicable to other furnaces. (A communication.)
1083. William Edward Newton, of 66, Chancery-lane—Improved machinery or apparatus for dressing millstones. (A communication.)
1084. George Bell, of Inchmichael, Perth—Invention of a new machine for several agricultural purposes.
1094. John Scott Russell, of Great George-street, Westminster—Improvements in marine steam engines.
1095. Charles Goodyear, of 25, Avenue-road, St. John's-wood—Improvements in combining india-rubber with certain metals.
1101. John Dempsey Holdforth, of Leeds—Improvements in machinery for combing or dressing silk and other fibrous substances.
1114. George Dowler, of Birmingham—Improvements in boxes for containing and igniting matches.
1115. Augustus Brackenbury, of Camden Town—Improvements in precipitating the muriate of soda from its solutions in water.
1125. James Nichol, of Edinburgh—Improvements in bookbinding.
1127. John Pullman, of 17, Greek-street, Soho—Improvements in the manufacture of losh, or oil-dressed leather.
1128 Henry Warner, Joseph Heywood, and William Cross, of Loughborough—Improvements in machinery used in the manufacture of framework knitting.
1146. Octavius Henry Smith, of Bedford-square, and Young Parfrey, of Pimlico—Improvements in the manufacture of carriage-wheels.
1148. George Tillett, of Kentish Town—Improvements in the manufacture of metal bedsteads.
1164. William Bradbury and Frederick Mullett Evans, of Whitefriars—Improvements in taking impressions, and producing printing surfaces. (A communication
1213. George Berry, of 19, Buttesland-street, St. Leonard's, Shoreditch—Invention of an improved method of roasting coffee, cocoa, and chicory.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| June 28 | 3479 | Sun-dial Rule. | James Parkes and Son | Birmingham. |

# SOCIETY OF ARTS.

**FRIDAY, JULY 8th, 1853.**

## GENERAL MEETING,

*Wednesday, July 6th*, 1853.

The General Meeting for the Election of Officers for the ensuing year was held on Wednesday, July 6th, 1853, Captain Henry C. Owen, R.E., in the chair.

The following Institutions have been taken into Union since the last meeting:

273. Bridgend, Mechanics' Institute.
274. Allenheads, Library and News' Room.
275. Blairgowrie and Rattray, Mechanics' Institution.
276. Coalcleugh, Library and News' Room.
277. Coventry, Mechanics' Institution.
278. Newhouse, Library and News' Room.
279. Manchester, Institutional Association of the Literary and Mechanics' Institutions of Lancashire and Cheshire;

and the names of fifteen Candidates for Membership were read.

The following Noblemen and Gentlemen were declared to be duly elected to fill the several offices for the ensuing year. The names in italics were not in last year's list.

PRESIDENT.

H.R.H. Prince Albert, F.R.S., &c., &c.

VICE-PRESIDENTS.

The Earl of Carlisle
The Earl Granville
The Lord Colborne
The Lord Monteagle
*The Lord Overstone*
Sir John P. Boileau, Bart.
The Rt. Hon. T. Milner Gibson, M.P.
*The Rt. Hon. Henry Tufnell, M.P.*
Sir C. Lemon, Bart. M.P.
Sir C. Pasley, K.C.B.
Joseph Hume, M.P.
*William Ewart, M.P.*
*William Hutt, M.P.*
Samuel Morton Peto, M.P.
Robert Stephenson, M.P.
Henry Thomas Hope
C. Wentworth Dilke
J. M. Rendel
W. Tooke, F.R.S.
J. Scott Russell, F.R.S.

COUNCIL.

*William Bird*
Rev. Dr. Booth, F.R.S.
Harry Chester
*Henry Cole, C.B.*
*The Dean of Hereford*
*J. C. Macdonald*
Captain H. C. Owen, R.E.
Dr. Lyon Playfair, C.B. F.R.S.
W. W. Saunders, F.R.S.
Warren De la Rue, F.R.S.
Thomas Twining, jun.
Captain Eardley Wilmot, R.A.

TREASURERS.

Thomas Winkworth
*Samuel Redgrave*

AUDITORS.

Peter Graham
*Don Manuel de Ysasi*

SECRETARY.

*Peter Le Neve Foster, M.A.*

COLLECTOR AND FINANCIAL OFFICER.

S. T. Davenport

## NOTICE TO INSTITUTIONS.

The Council have much gratification in announcing that, pending their negotiations with the publishers, they have received a communication from the Representative of the late Colonel Gurwood, offering to the Institutions in Union copies of the well-known "Despatches of the Duke of Wellington," published at eight guineas in eight volumes, royal octavo, bound in cloth, for four guineas. The Council wish particularly to call attention to this favourable opportunity of obtaining on very liberal terms a work which, they presume to say, should be found in every public library. They will receive orders for the work, which should be accompanied by a Post-office order for four guineas, and will arrange for its prompt transmission.

## THE PAPER DUTY.

The Council having directed an inquiry to be instituted into the operation of the present fiscal restrictions on paper, advertisements, news, and foreign books, the Committee charged with the conduct of that inquiry, issued a series of Queries addressed to the different classes likely to be affected by the operation of the Paper Duty. These queries embodied, as far as possible, all that had previously been urged by writers against the duty, and were designed to test the general accuracy of the complaints thus made. The classes addressed were, 1. Manufacturers. 2. Wholesale Stationers. 3. Manufacturers from Paper and Manufacturers using it. 4. Publishers. 5. Newspaper Proprietors and Editors. 6. Authors. It is proposed, through the Journal of the Society, to draw attention to the valuable evidence which has been collected in answer to these Queries; and as it would be impossible to publish the whole at once, it is intended to give the replies sent in to each set of Queries in the manner which the subjoined will illustrate.

### QUERIES PROPOSED BY THE SOCIETY OF ARTS, MAY 4TH, 1853.

### No. 1.—To Manufacturers.

1. Does the mode in which the Duty is collected interfere injuriously with the processes of the manufacture, and in what way?

Mr. C. D. Collet says, "It obliges the manufacturer to dry his paper in order to avoid paying duty on water; the paper, if intended for printing, has to be wetted, and might be rolled from the machine to the printing-press if the law did not interfere."

Mr. W. J. Dowding says, "Yes; a greater number of hands are kept to weigh and reweigh, and a larger stock is oftener kept than would be, if paper were sold as orders may come in. It has a tendency to holding stocks until after what is called making-up days. Also posting labels on the reams, and the great care to keep charge of same, not to lose any."

Messrs. Hastings and Mellor say, "No; it does not."

Mr. Edmund Shaw writes, "Yes: inasmuch as many tons are obliged to be returned to the engines to re-make, on account of some slight accident; because the heavy duty prevents spoiled paper from being disposed of at a low price."

Mr. W. Stones says, "The actual processes are not much interfered with, but some attendant operations very much so. It frequently occurs that a buyer of any given parcel of paper is desirous, for his particular object, to have it more highly glazed; now, as a maker is not allowed to receive paper back into the mill when it has once left, this additional surface can only be given at a considerable expense in London, or, should the maker surreptitiously take it back to the mill, he is liable to a penalty, and to have the paper seized. I have known a maker pay many pounds for glazing one parcel of paper in London, which he could have easily done at his own mill, but he did not wish to incur risk. It sometimes happens that we find, on examination in town, that a parcel of paper has not been sorted so carefully as usual; this error can only be rectified by bringing the overlookers from the mill at great inconvenience, otherwise actual loss is the result from depreciation in the character of the paper. We cannot make envelopes. By not allowing the return of paper to the mill, it is in the power of the receiver to make many frivolous objections to lower the value, knowing it cannot be taken back."

Messrs. P. Summers and Son "use some thousand reams per annum, all of which must be marked when opened, or we are liable to a penalty. In exporting, there is often a great delay in getting the officer here to mark the paper for drawback."

Mr. C. Venables says, "It does not interfere with it at all."

Messrs. Venables, Wilson, and Tyler say, "The duty on paper is not taken until the manufacture is complete, and the paper is tied up in a cover, and is ready to be sent from the mill. The only way in which it interferes is by requiring the manufacturer to enter in the exciseman's books the different parts of the mill as designed for the different departments of the process: the exciseman seldom exercises the power he has of visiting the different parts of the premises."

Messrs. Wellington and Hutton (late W. Leschallas), say, "No."

An Anonymous Correspondent says, "Decidedly not; on the contrary, I think the collection of the duty helps to keep order and regularity in a paper-mill."

### 2. Does it affect the quality and varieties of the article manufactured?

Mr. C. D. Collet says, "A duty in weight must have the effect of deteriorating the quality of an article in proportion to its weight."

Mr. W. J. Dowding says, "Yes; it is different from other trades: we never seem at liberty to introduce anything new, owing to the superintendence continually of the Excise-officer.

Messrs. Hastings and Mellor say, "No."

Mr. Edmund Shaw says, "It prevents experiments being made with new descriptions of material, because of the loss of duty in case they do not at first succeed."

Mr. W. Stones says, "In the lower sort of papers very materially. The duty on 'browns' being nearly 100 per cent. of the intrinsic value of the paper, it is evident that, speaking roughly, if out of every 4*d.* half, or 2*d.*, is duty, it must very much narrow the sources of material for such paper. The same remarks apply to cheap writing papers, the very cheapest of which cannot be produced under 7½*d.*; from this if 2*d.* be deducted for duty, the actual cost of the article is 5½*d.*: allowing that only ½*d.* of the duty were expended in a better quality of rags, it is evident that for 6*d.* per lb. a superior article, by 10 per cent., could be produced than is at present for 7½*d.*, and for 7*d.* as good as is now supplied at 9*d.* For many educational purposes, and for most general purposes these lower qualities are quite good enough."

Messrs. P. Summers and Son say, "Yes."

Mr. C. Venables says, "It does not."

Messrs. Venables, Wilson, and Tyler, say, "Not in any way."

Messrs. Wellington and Hutton say, "No."

An Anonymous Correspondent says, "No; not in any way."

### 3. Does it limit materially the quantity of the supply?

Mr. C. D. Collet says, "Yes."

Mr. W. J. Dowding "Should think not much; but limits the demand to a very great extent. Such papers as I sometimes sell at 32*s.* per cwt., nearly 15*s.* of this is for duty; and if bad debts are made, the duty must be paid the same. It is a gross injustice to make the coarser kinds of paper pay the same as the finest qualities. Hence the difficulty in preventing frauds on the revenue; where this is done it is on the coarser kinds of paper."

Messrs. Hastings and Mellor say, "Inasmuch as it causes an increase in price, it does."

Mr. Edmund Shaw says, "Very much. If brown and other common papers were about half the price, they would be used for a variety of purposes other than at present, and the manufacture would be vastly increased, and thus in the rural districts employ a great many women."

Mr. William Stones says, "Of the lower qualities it does, because the margin for rags and labour is so small; the demand for printing would be much larger in the absence of a duty, and the supply would greatly increase."

Mr. C. Venables says, "Certainly not."

Messrs. Venables, Wilson, and Tyler say, "We do not consider the mode in which the duty is collected limits the supply in any manner; but, on the contrary, the credit which is given for duty (about two months), is an assistance in capital to the small manufacturer. The duty itself, doubtless, is a check upon consumption, but not to any considerable extent, because the present price of paper is so low as not to make it an object to economize in its use."

Messrs. Wellington and Hutton say, "No."

An Anonymous Correspondent says, "No. The supply will be somewhat limited by the scarcity of rags, which the French and other foreign Governments do not permit to be *exported to this* country; and at the same time an immense exportation of English rags is being carried on, to America and elsewhere."

### 4. Do the Excise regulations interfere with the rapid execution of orders? and if so, do they neutralize in any degree the power of immediate production, which is the result of improved processes, and of instant delivery, which is the consequence of quick transit?

Mr. C. D. Collet says, "Yes."

Mr. W. J. Dowding says, "Yes; my mill being not situate in a market-town, no one ever, or very seldom, thinks of applying to me for an order to be delivered immediately; as it takes four days to get paper out of the mill, and if a large quantity five days, which is a serious drawback in these days of railway travelling; it shuts us out of certain markets altogether."

Messrs. Hastings and Mellor say, "Yes; and they do interfere very considerably with the delivery of the paper when ready for market, and to a certain extent neutralize the advantage of railway rapidity."

Mr. Edmund Shaw, says, "Yes, most materially; for instance, at this mill (Colthrop Mill, Thatcham), if an order is sent from London (fifty miles) on Saturday morning, although the paper is tied up ready to send, it cannot be in London *by rail* before *Friday* or *Saturday* following, instead of *Monday morning*, and consequently shipping orders are constantly lost from the delay. It acts thus,—the order received on Sunday, on Monday give forty-eight hours' notice to the Excise to attend and charge on Wednesday; then keep the paper lying in the scales twenty-four hours for the super to re-weigh, making Thursday afternoon before the paper can be moved; if any quantity, it is too late for that afternoon's train, so leaves on Friday, and is in London on Saturday, making a week to deliver an order, and only fifty miles from London. Another case,—a barge with a quantity of paper sank just after it left the mill; the paper could not be brought into the mill again to dry without sending some miles for an officer to view and grant a certificate, and then it was all spoiled and obliged to be worked over again, and the duty not remitted; thus paying twice for the same paper, in addition to loss in value, from 36*s.* to 6*s.* per cwt. by water damage. Again, in loading a waggon, by some means two reams got left behind; the super came along and *seized* them, causing a correspondence with the Board (in the meantime the paper to make again), and at last returned upon paying postage 2*d.*; thus, although paying 8,000*l.* to 10,000*l.* a year duty, accused of fraud, value a few shillings, only because the carter left two reams behind, properly charged, but entered as to go out a few hours earlier. Again, some heavy reams dried a little more than expected, and when the super came round to reweigh, had lost two per cent., or some trifle; and although duty was paid on the full, the paper was seized and *taken away*, causing a correspondence and a ridiculous caution from Head-office, when so far from fraud, an extra amount of duty had been paid. The five per cent. is very oppressive upon heavy makers of common papers; as in the first instance, five per cent. is added to the duty, and then custom of trade allows a discount of 2½, and the cost of labour in weighing and reweighing, &c., is full 2½, making 10 per cent. real cost on the duty; the maker has all the risk of bad debts, besides having to compete with the unfair trader who evades the duty. The duty is nearly one half the amount of the manufactured article in common papers, and more than double the amount of raw material, which is a great temptation to unprincipled makers. The advantage of quick transit by rail is neutralized by the Excise regulations detaining you at least seventy-two hours."

Mr. W. Stones says, "By requiring a long notice before charging, and that the paper must be left in a packed state in the mill twenty-four hours after charging previous to its removal, very much inconvenience is experienced by the maker. I will suppose an order given here to-day for a particular machine paper, no other circumstance than the Excise regulations prevents the paper being made at our mills the same evening, and delivered in town the following day. By the Excise regulations we cannot do so. Thousands of cases occur annually of paper-makers rendering themselves liable to penalties; some are reported, others are unnoticed by the officers, and in a few cases penalties are inflicted. The inconvenience is to some extent avoided in one of the following manners:—by giving frequent, even daily notices, to charge, the larger portion of which attendances are unnecessary, thus wasting the time of the revenue-officer; and by charging 'Dummies.' Supposing an order is received at a mill on the day of charging for, say ten reams of a particular sort of paper, which cannot be ready until after the departure of the officer, and they cannot be detained until the next charging; ten reams of a similar paper are charged, and the wrappers changed when the required paper is finished, the really charged paper being returned into the uncharged stock."

Messrs. P. Summers and Son say, "Yes; *most decidedly*."

Mr. C. Venables says, "The Excise regulations may delay the delivery of paper under any circumstances not more than twenty-four hours."

Messrs. Venables, Wilson, and Tyler, say, "We speak practically; that we find little or no interference in the rapid execution of our orders from the Excise regulations; we are always able to know prospectively the time at which paper will be ready to be charged with duty, and on giving notice to the Excise-officer, we find him generally ready to attend at such time, or nearly to it."

Messrs. Wellington and Hutton say, "Yes; the Excise Laws compel the maker to keep his paper some time after charged by the proper officer, for *re*weighing by a supervisor in case of need—hence delay."

An Anonymous Correspondent says, "Neither; by the recent *relaxation* allowed by the Excise, *six hours* is the utmost extent of the detention of paper, and in pressing cases even this may be obviated."

### 5. Does it prevent the use of new materials in the manufacture?

Mr. C. D. Collet says, "To a great extent, but not altogether. Straw is beginning to be used, and is even made into *boards* of great strength."

Mr. W. J. Dowding says, "Yes; I should think so, decidedly. Anything new is often the work of years of study and application, and no one who studied his own interest would apply his mind to such a work much, when he would know by the first post his brains would be carried to any part of the world to use as they might think fit."

Messrs. Hastings and Mellor say, "No."

Mr. Edmund Shaw says, "Considerably."

Messrs. P. Summers and Son say, "Yes."

Mr. C. Venables says, "I have never known it do so."

Messrs. Venables, Wilson, and Tyler say, "Not in any manner; there is no interference in the manufacture or in material used."

Messrs. Wellington and Hutton say, "No."

An Anonymous Correspondent writes, "Certainly *not*. On the contrary, new materials are being used DAILY."

### 6. Does it place the manufacturer at a disadvantage in the markets, by putting him in the power of customers who are capitalists?

Mr. C. D. Collet says, "It does, but it would be worse if his customers were not capitalists. The small manufacturers are being driven out of the field, as would be known if a return were made of the mills given up since 1836."

Mr. W. J. **Dowding** says, "Yes. Many a paper-maker has been ruined in this way. He often sends his paper to the wholesale houses to be sold, and when duty-day arrives the capitalist knows it as well as the paper-maker, and he is obliged to submit to anything when once in their hands."

Messrs. **Hastings** and **Mellor** say, "It does, where he is short of the capital required for the extent of his business."

Mr. **Edmund Shaw** says, "Decidedly so. The duty being paid by the manufacturer immediately, and the customary credit in the trade being four months."

Mr. W. **Stones** says, "It is only within the last few years that paper-makers have had direct communication with consumers and retailers, the whole of the trade having previously been monopolized by a few wholesale stationers; even at present, there are about seven manufacturers who have London houses, and seven other persons who act as commission agents. A very large number of makers are almost entirely in the power of wholesale stationers, depending upon them for advances to meet the duty. This gives rise to oppression and unfair competition, as it almost compels the maker to accept whatever price the wholesale stationer may put upon his goods."

Messrs. P. **Summers** and **Son** say, "Yes."

Mr. C. **Venables** says, "It may have this tendency."

Messrs. **Venables**, **Wilson**, and **Tyler** say, "We assert strongly that it does not, at any rate, in the London market. We are not able to speak so well of country places, but we believe not. We consider where a manufacturer is compelled to make a sacrifice to pay his duty, he is not in a situation to carry on his trade if no duty had to be paid."

Messrs. **Wellington** and **Hutton** say, "Somewhat, but to a slight degree only, and in but few cases."

An **Anonymous Correspondent** says, "No; I believe a good manager will make the paper duty an assistance to him rather than otherwise."

### 7. Please to state any facts relative to the above, or any other points bearing on this inquiry.

Mr. C. D. **Collet** says, "Many of the manufacturers actually wish the duty kept on, which is a suspicious sign; many more are willing to bear the tax in consideration of the protection given against foreign paper. The absence of the duty would enable us to export large quantities, both as paper and in the shape of books, which might then be sold cheap enough to compete with American books."

Mr. W. J. **Dowding** says, "It appears to me to be a bad way of raising revenue in paying men to look after traders, and no doubt dishonest traders pay a good deal to look after the officer; it does appear to be not a very economical mode of doing business."

Messrs. **Hastings** and **Mellor** say, "It entails a very considerable expense upon the manufacturer in weighing and reweighing for the duty and otherwise complying with the Excise regulations, such as writing upon each ream, dating, and stamping."

Mr. **Edmund Shaw** says, "The 5 per cent. or 9*d.* per cwt. on the duty is most unjust to the manufacturer of heavy common papers, and is not paid by the consumer, as at the very time the 5 per cent. was added, brown paper fell 2*l.* per ton. Had the duty been doubled it would have been obtained, but 5 per cent., although amounting to a large sum, upon 10,000*l.* in the year, is too small a proportion to add to the price of the paper."

Messrs. **Venables**, **Wilson**, and **Tyler** say, "The removal of Excise duty from an article of such general use as paper cannot but be a desideratum; but it must be borne in mind the supply of the article from which it is made is limited, and should any considerable increase in the manufacture take place, the price of the raw material would be materially advanced. It has been said other articles or materials will be found as a substitute for rags, but after many years' experience in the trial of various substances for this purpose, and under this impression, the conviction is forced upon us that it will be long ere a material is found which will be practically available for the manufacture."

Messrs. **Wellington** and **Hutton** "are not aware that we can say anything further on the subject. The duty is a nuisance to the maker, but possibly not more so than most duties. Should it be repealed, an important matter will be that the dealer, who is generally the holder of a heavy stock, should be allowed the duty thereon, or at any rate upon such portion as had been made within a reasonable time; this is nothing but justice to the holder of large stocks."

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In the debate on the Advertisement Duty, Friday, July 1st,

**The Chancellor** of the **Exchequer** said, "The Paper Duty, he was quite ready to admit, was an inexpedient and impolitic tax altogether, because it imposed on the trade of the country a burden totally disproportioned to the amount of revenue received. (Hear, hear.) It interfered with employment throughout the country in a most inconvenient form, because the paper trade, if free, would not be confined to the great centres of population, but would find its way to other localities throughout the country, and diffuse employment among a different class of the population. (Hear, hear.) Therefore the Paper Duty was a tax essentially bad in itself, and, so soon as the state of the Treasury would allow, it ought to be repealed." (Hear, hear.)

## DEPARTMENT OF SCIENCE AND ART.

A Library in the Art section of this department, consisting at present of about 2,000 volumes, portfolios of prints, drawings, &c., relating to decorative art and ornamental manufactures of every description, has been established, and is now open daily, mornings and evenings, for the use of students, manufacturers, artizans, and the public in general, subject to the rules of the Department.

"It has," as stated in the prospectus, "its special object, and is emphatically a special library; special in its contents, and peculiar in its administration: its object is to aid in every way the development of taste as applied to industrial art; and the peculiarity of its administration is, that it is made as accessible to the most illiterate as to the best informed."

It has been arranged as nearly as practicable according to the classification of arts and trades adopted in the Great Exhibition of 1851, as that classification has been made, to a certain extent, familiar to the public.

"Its peculiar advantages are these: it is intended to bring together, in the course of time, all works, wherever published, which may in any way illustrate, or aid in the development of, the useful arts in relation to taste, in matters of personal or domestic use, and every variety of social refinement depending on manufacturing skill."

The library is accessible to all on the payment of a small fee, either for the particular occasion, for the month, or for the year.

"Such a library, though special, must eventually become one of great magnitude, and can be only gradually developed; its development will depend much on the use those for whom it is organized may make of it. In its present incipient state much will be required of it that it will not be able to supply; but the knowledge of wants must inevitably precede their supply; all requests will be attended to, and all genuine requirements, as soon as possible, in accordance with the means of the institution. This, however, is certain, that the efficiency of this library rests with the public themselves, and that its growth will be dependent on the use that is made of it."

The Library will be open every day, except the usual vacations at Government offices, from ten in the morning until nine at night, except Saturday evenings.

## IMPROVEMENTS IN MACHINERY FOR PRINTING CALICO AND OTHER FABRICS, BY WHICH TEN OR MORE DIFFERENT COLOURS MAY BE WORKED SIMULTANEOUSLY, AND WITH ACCURATE REGISTER.

BY MR. JOHN DALTON, OF HOLLINGWORTH.

Among the List of the various subjects for Premiums issued by your Society, and recommended to the study of the public, my attention has been especially directed by your Secretary to the desiderata stated at the head of this Paper. With this subject I, as a Calico Printer, am necessarily familiar; and, deeply impressed with its importance to the trade, have for some time past bestowed upon it my earnest consideration. Desirous of promoting, as far as my humble abilities will tend, the laudable objects of your Society, I have great pleasure in responding to your call, and in laying before you the results of my experience on this head; and I feel confident that I shall be able to show that the difficulties hitherto attending the printing of ten or more colours simultaneously, with an accurate register, may be successfully and simply overcome.

To render this communication the more valuable to the public, I have deemed it desirable to submit to your notice two distinct plans or machines, whereby this result may be arrived at; both indeed involving the same principle, but differing in mechanical details. The chief merit of the first of these plans consists in the simple application of certain improvements to the present arrangement of machinery used for printing ten or more colours, at a cost comparatively trifling, and ultimately resulting in considerable economy, and which improvements will be found equally beneficial when applied to machines for printing single or fewer colours than is stated in your prospectus. Although this latter feature cannot strictly be considered as coming under the title of the present subject, I have nevertheless deemed it worthy of mention, as the promotion of improvements in all branches of industry constitutes the distinctive aim of your Society. The second plan to which I shall afterwards call your attention, will exhibit an entirely novel arrangement of machinery, by means of which a more simple and efficient mode of printing any number of colours will be introduced to the notice of the public.

Before entering on the particular subject of this communication, it will, perhaps, be as well for the clear elucidation of the merits of my Invention if I explain shortly the principle and more important features of the machines in present use in the several printing establishments of this country, with reference simply to the process of depositing the colour upon the textile fabric, omitting all minor details connected with such machines; such as traverse motion, application of motive power or pressure to the rollers, &c., these being merely mechanical accessories subservient to the more important parts, and differing in the means adopted to produce the same effect. I shall afterwards proceed to point out the causes from which the difficulty of obtaining an accurate register of the pattern arises, and the improvements proposed by me to remove the objection. This course appears the more suitable, as the first of my plans is based upon the present arrangement, and will save a particular explanation when treating of such plan.

The part of the ordinary printing machines whether for single or more colours that first arrests the attention of the observer, is the large pressure cylinder of cast-iron, of a diameter proportioned to the number of colours for which the machine is fitted up. The purpose of this cylinder is to serve as a bed for the textile fabric on its receiving the pressure of the engraved roller. As the metallic nature of the cylinder would present a surface too hard to admit the pressure being effective, it is the universal practice to coil round it several folds of a web termed lapping, composed of woollen weft and linen warp; and in addition to this covering, a thick woollen blanket or endless web is used to carry the textile fabric in its passage round the pressure cylinder, in order to insure a greater evenness and regularity of surface. In apposition to the iron cylinder, the several copper rollers engraved with their respective patterns for each distinctive colour, are arranged in symmetrical order. These engraved rollers are, where the situation will allow, severally furnished with colour-boxes and furnishing rollers, usually made of wood, and covered with vulcanized India-rubber or flannel. The latter serve to distribute the colour evenly in the depressed lines of the engraving.

The excess of colour is removed from the engraved rollers by thin plates of steel called "doctors," which are fastened in metallic plates, and are pressed at a certain angle against the engraved rollers by an adjustment of levers and screws. In order to preserve the fine edge of the "doctors" uniform, a movement in a lateral or transverse direction is communicated to them, as otherwise they would soon be worn uneven from their contact with the metallic roller. This movement is designated the Traverse Motion. Similar steel plates, called "lint doctors," are placed on the opposite side to clear away any particles of lint or loose fibres of the cloth, which would otherwise be carried round to the colour-box and cause inferior work. These last-mentioned "doctors" are adjusted by setting screws to their proper position.

The above is a short outline of the general arrangement existing amongst printers, and will, I trust, be sufficient to give an idea of the nature of the machinery in question, and enable you to comprehend more clearly the effect of my contemplated improvements.

The principal source of objection in this arrangement, it is admitted, arises from the inefficiency of the medium employed to resist the pressure of the engraved roller, namely, the iron cylinder with its folds of lapping and endless web or blanket. It is of primary importance to the attainment of a perfect impression from the engraved roller on the cloth, that the surface of such medium should be perfectly smooth and even, and should also possess a sufficient softness and elasticity to enable the cloth to take up the colour from the depressed lines of the engraving, without being in itself permanently indented or marked by the pressure. It is a matter of extreme difficulty to obtain these desiderata with the mechanical arrangement explained. Numerous inequalities in the texture of the web, and slight variations in thickness, exist in the newest blankets; and after being a short time subjected to the abrasive action of the machine, accumulations of woollen particles take place, termed in the trade, "flocking." This unevenness of surface necessarily occasions a corresponding variation in the depth of shade produced by the impression, and an omission altogether of the finer lines of the pattern. The wear of the blankets is very rapid, and from the progressive deterioration, an uniformity of impression cannot be depended on. The folds of lapping also wear away very quickly, and are liable to break by force of the pressure employed, thereby causing a break in the impression, and other damage to the work.

The above objections may, to a certain extent, be obviated as regards single coloured machines by unremitting attention and the employment of fine and consequently more expensive blankets; yet when the same arrangement is used with machines printing several colours, a new difficulty arises. Experience shows that the pressure of each engraved roller causes this soft bed of wool to stretch or expand longitudinally, so that when the piece is brought into contact with the subsequent roller, an accurate register of the pattern will not be given unless precautions are taken to compensate exactly for such extension of the web. This extension is not uniform as regards the several rollers, being affected in the greatest degree on coming into contact with the second roller, and diminishing in intensity with each subsequent roller. The variations are further dependent on the particular manufacture and quality of the web used. To compensate for this extension, the engraver requires to be specially instructed to make the second roller of greater diameter, and also a little wider than the preceding one, and the pattern on a corresponding increased scale; and to proportion the size and the engraving of the subsequent rollers in exact conformity to the expected variations in extension.

This allowance necessarily requires a great nicety of calculation, and will seldom prove satisfactory. Again, the rollers thus varying in size must always be employed in the same rotation of order for which they were originally engraved, and the printer is thereby deprived of the advantage of altering the arrangement and diversifying the design by a different combination of the colours, as some colours are obliged to be put on first, and others later in the working series.

From the above remarks, it will be seen that the inefficiency of the present system is attributable solely to the unfitness of the blanket and lapping to afford the proper surface as the medium of resistance to the pressure of the engraved roller. Hence, I have made it my earnest study for some years past to discover some other substance, which I might adopt in substitution of such woollen fabrics, and which would combine in itself the power of resistance without extension, and the essential requirements of permanent smoothness, evenness, and elasticity of surface with ultimate economy. With these desiderata in view, I have been led, from a consideration of the natural properties of gutta percha, which has of late acquired so important a position in all departments of practical science, to make a series of experiments with that material, and I may now venture to congratulate myself on their successful issue. In January, 1850, I brought my labours to a close, and took out a patent for my discovery; since which time I have entirely abandoned the old system in my own works, all my printing machines being fitted up on the principle hereafter explained.

I will now proceed to explain as concisely as I can the nature and application of my invention with its accompanying advantages, and illustrate it particularly as regards the printing of the number of colours stated in your prospectus. My improvements consist simply in the entire removal from the machine of the iron cylinder with its folds of lapping and blanket, and substituting in their stead a solid bowl or roller of corresponding size constructed with an exterior covering of gutta percha, of at least one inch and a half in thickness. This bowl is manufactured on such a principle as to combine solidity and great resisting power with economy of material, and the mode of its construction is fully detailed in the specification of my said patent.

In the bowls so made will be found united the several qualities which I before stated to be required to constitute a perfect yielding medium, and for which office the present arrangement is shown to be objectionable. I send herewith a model of a bowl, for the machine secondly hereinafter described, made on the scale of four inches to the foot, that you may the more satisfactorily judge of my assertions as to its fitness for the purpose to which I have adapted it, and the advantages attending its use. It will be seen that the surface is quite smooth and even; that the structure is solid and capable of sustaining greater pressure than it would have to endure in printing, and that its elasticity is such as to yield sufficiently to the pressure of the roller and allow the pattern to be impressed on the cloth without the slightest extension of surface. The advantages proved, from experience at my own works, to accrue from the adoption of these improvements can be truthfully enumerated. as embracing the following points: 1st. An uniformity and regularity of impression. The finest pin grounds and the most solid blotch pattern can, with equal facility and distinctness, be printed on the textile fabric. 2ndly. The saving of power. This results from the diminution of pressure required to bring out the engraving, and the smoothness of the face of the bowl. This saving may be calculated at about one-third. 3rdly. The economy of its use considered both as to labour and expense. Under the old system considerable time and labour is constantly taken up, in folding and fastening the lapping round the iron cylinder, in fitting on and renewing fresh blankets when the edges are soiled with colour, and also in washing and dressing the latter. All this labour is saved by my arrangement. In expense, the primary cost of my improvements will not exceed the necessary outlay for the lappings and blankets required by the machine for a single year, allowing two bowls to each machine for a change, in case of accidental injury to the one in use. The expense of maintaining them for future years in their pristine order will not exceed at the most *5l.* per annum, while the cost of blankets and lappings per machine is estimated by many printers at *150l.* per annum. In case of accidental injury to the surface of the bowls, they can easily be repaired with a heated iron, as mentioned in my said specification.

The above are features equally valuable for machines printing single or more colours; but in relation to the latter, a further advantage accrues, namely, that of requiring no allowance to be made in the engraving of the several rollers to compensate for extension, and hence of serving to secure an exact register of the design on the fabric.

It is but proper for me to state that the nature of the material precludes its being elevated to a higher temperature than 100° Fahrenheit. At this heat the gutta percha has a tendency to become soft and plastic, and loses its elasticity, until again reduced to 100° Fahrenheit. This elevation will only arise in this country from neglect in attending to the lubrication of the journals of the mandrills or bowl, or other gross neglect on the part of the workman.

Having thus summarily stated the most striking advantages of my improvements over the old system, I shall proceed to illustrate the working of a machine for printing ten colours simultaneously, based upon the present form of arrangement, and similar to the present machines in all respects, except the adoption therein of my invention. This machine will, I feel confident, fully answer the requirements mentioned in your prospectus.

In the middle of the framework, supporting the different parts of the machine, instead of the usual iron cylinder, lapping, and blanket, one of my patent gutta percha bowls of similar dimensions is placed, and revolves in its bearings. The engraved copper cylinders, serving to produce the particular pattern on the cloth, are all of equal diameter and length, and the pattern is engraved on each without the slightest allowance for extension,—consequently they can be varied at will in order of rotation. These engraved cylinders being hollow, iron mandrills are passed through their respective centres as a support, and the journals revolve in brass steps. Between these steps and the framework a small space is left, so as to allow the engraved cylinder to be moved laterally, and facilitate the fitting-in of the pattern in that direction. This iron mandrill projects beyond the framework on one side, and on it a certain description of wheel, termed a fitting-in wheel, is affixed. The object of these fitting-in wheels is to assist the proper adjustment of the engraved cylinders in their respective positions with regard to the pattern, and maintain them while printing in uniform relation to each other. These fitting-in wheels must be of uniform size, and are constructed of two separate solid divisions; the inner part, or boss, being distinct from the outer rim containing the cogs, and fastened on the iron mandrill by a cotter. To the outer rim a transverse piece of iron is riveted, through which a screw in connection with the inner boss is passed. On turning this screw a corresponding movement is imparted to the engraved roller, independent of the outer rim; and thus the workman is enabled to effect the minutest adjustment of that particular roller in its relation to the others. The screw only allows a slight movement to be given to the roller, but if a greater variation is required, the wheel must be thrown out of gear, and adjusted sufficiently close to be within range of the movement afforded by the screw. The engraved rollers should then be marked with a point, to facilitate their future adjustment. To maintain the several fitting-in wheels in uniform motion, a large intermediate wheel is fixed, revolving on a centre on a level with, but distinct from, the centre of the gutta percha bowl, and to the shaft of this wheel the gearing is connected, imparting motion to the machine. The several engraved cylinders, with the exception of the two lower ones, are pressed against the gutta percha bowl by means of screws and springs enclosed in a box, and the two lower rollers by screws and levers. The engraved cylinders are also, with the exception of the two upper ones, fitted up with colour boxes and furnishing rollers in the ordinary manner. The two upper ones, for want of room, are supplied with what are called "doctor boxes," combining the "doctor" with the colour box.

Before I proceed to illustrate the working of this machine, I may premise that it will be desirable to make use of a grey calico underneath the piece, to prevent the edges of the bowl being soiled with colour, —an arrangement in general use with printers using blankets, &c.

The differents parts of the machine being adjusted in their respective positions, the calico is brought into contact with the gutta percha bowl, and, as it were, clings to its surface, and, passing on with the revolution of the bowl, receives the pressure of the first engraved cylinder. The elasticity of the surface of the bowl gives way to the pressure sufficiently to enable the depressed lines of the engraving to imprint the colour on the cloth without any consequent depression remaining on the bowl, and as the latter is obviously free from all liability to extension, the cloth remains in exactly the same relative situation when carried in contact with each successive cylinder. Thus when once an accurate adjustment of the several cylinders is obtained, no variation can take place from that cause, and any number of pieces may be printed in constant succession.

I may also add that the efficiency of the bowl is further aided by an electric action which takes place between the gutta percha bowl and the copper roller, while printing. The former, being in a state of positive electricity attracts the colouring matter from the electro-negative roller, and assists its deposit upon the cloth.

From the above remarks, it will be seen that the means by which I propose to obviate the defects existing in the present machines, are extremely simple, merely involving the removal of the cause of such defects, and the substitution of a more efficient medium instead, but I trust that the plan will not on account of its simplicity be deemed less deserving of attention. My object in pointing out these improvements has been to aid, as far as I can, the aim of your Society, and benefit the manufacturing interests of the country, by showing that the means of rendering their present machinery more efficient, are not only accessible to all, but that from their adoption, considerable economy will necessarily result.

Having accomplished this, I now respectfully invite your attention to the consideration of the second plan, which at the outset, I proposed to bring before your notice in connection with the present subject, and which I believe, with due deference, will combine simplicity of arrangement, less expense in construction, and greater efficiency. This machine is based upon the same improved principle that I have introduced to your notice in treating of the former machine, but the mechanical arrangement and details are totally different.

The framework is constructed in three equal divisions, or sections, each division being fitted up with three gutta percha bowls; all these bowls are of equal size, and revolve in brass steps, and are raised when required by large screws. The two outer bowls of each division are pressed upon the engraved cylinders by weights acting with levers against the bearings. The centre bowl is pressed in a similar manner by springs enclosed in a box in connection with the screw. The engraved copper cylinders, fastened on their mandrills, are placed at equal distances horizontally on the framework, so that the pressure from each gutta percha bowl is received by the two copper cylinders revolving in contact with it. Thus, the first engraved cylinder receives the pressure only of the gutta percha bowl, the second cylinder of both bowls, the third cylinder of both bowls, and so on in like manner except the last cylinder, which merely receives the pressure of one bowl. All these engraved cylinders are of the same diameter and width, without the slightest allowance in the engraving for extension.

The journals of the mandrills revolve in brass steps, and on one side of the machine project beyond the framework. On these projecting ends the fitting-in wheels, described in the explanation of the former machine, are fixed, but instead of one intermediate wheel being used as in that machine, a separate intermediate wheel of the same size as the fitting-in wheels moves in connection with each pair of the latter. To each engraved cylinder a furnishing roller is placed in the colour box underneath, and is kept in uniform motion with the cylinder by means of connecting wheels. The traverse or lateral motion required by the colour "doctors" in order to preserve an equal wearing of the edge, is effected by an eccentric movement placed on the extremity of the bearings of the centre gutta percha bowl of each division, which acts by cranks placed on the side of the frame, and connected by a rod and pivot on the "doctor" shears. This arrangement will cause the "doctor" to vibrate slowly from side to side about one inch along the face of the cylinder.

The engraved cylinders being all fitted in, and adjusted to their respective places in relation to the fabric, the machine is set in motion. The cloth progressively unwinding off its roll, passes over rollers and through radiating bars to remove all creases in the fabric, and is then carried on to the first gutta-percha bowl, where it receives the impression of the first colour from the engraved cylinder. Passing on with the revolution of the bowl, it next receives the impression of the second colour from the engraved cylinder by its pressure against the first bowl; and moving with the same engraved cylinder, a second pressure is given to it by the second gutta percha bowl, thus receiving what is technically called two nips with each cylinder, except the first and last. The advantage sought for by this, is to bring out the impression more clearly and forcibly on the fabric; and in case the pressure of the first bowl should chance to be ineffective, the omission will be rectified on its coming into contact with the second bowl. In similar manner the fabric traverses the whole machine, and being printed with ten colours, passes on to the drying stage.

Besides the superiority of impression resulting from the double nip or pressure given to the several engraved cylinders, other important advantages will be gained by my new mechanical arrangement. The machine may at any future period be enlarged, so as to print a still greater number of colours, by merely fitting to it an additional section or division, and thus its capacity of printing any number of colours is unlimited.

The pressure in printing is furnished by the gutta percha bowl, and the engraved cylinders remain steady in their bearings, instead of the reverse being the case, as with the present machines. Hence any casual variation or inequality in the surface will merely affect the pressure bowl, and the relative position of the engraved cylinders will remain undisturbed. With the old arrangement such inequality tends to throw the roller out of its true centre, and the correct fitting in of the pattern is thereby deranged. The pressure being given from above, directly upon each engraved cylinder alike, will also be more steady and regular. The fitting-in wheels and intermediates being all of the same size, must necessarily ensure an uniformity of motion throughout; and any accidental irregularity will only extend to the particular roller with which it is connected. When one large intermediate wheel is used, such irregularity is liable to affect the whole series of cylinders at different points of the design. From the uniformity of motion produced by my arrangement of the fitting-in wheels, a similar uniformity of impression necessarily results, as every revolution of the cylinders to which they are attached completes the pattern engraved upon them.

I trust that the foregoing explanation will be sufficient to demonstrate satisfactorily the capability of my new machine to attain the object proposed in your List of Premiums, namely, that of printing ten colours with an accurate register. I have made the explanations as concisely as I could, and have forborne entering into minor mechanical details, as these will be well understood by any parties familiar with machinery.

Before I conclude, I feel it due to myself to allude to a circumstance which, although it may appear somewhat irrelevant to the subject of this communication, may serve to remove an erroneous impression from the public mind.

In the year 1851 I exhibited in the Crystal Palace a two-coloured machine for printing simultaneously on both sides of the fabric, an invention of great importance to the trade, particularly applicable to fabrics for handkerchiefs, curtains, blinds, parasols, and other articles, where both sides of the fabric are exposed to view, and it is desirable that they should exactly correspond. This machine exhibited in the most striking manner the same principle as is shown in the machines before explained, and clearly illustrated not only the possibility of producing an impression without the intervention of either lapping or blanket, but the superiority of such impression and the exact register of the pattern from the engraved cylinders. The arrangement consisted simply in the fitting up of two gutta percha bowls of the same size, one directly over the other (though not in contact), each bowl being furnished with two copper cylinders and the other requisite usual appliances. The fabric, after receiving the impression of both engraved rollers attached to the lower gutta percha bowl, crossed between the bowls, and presenting the reverse side to the action of the engraved cylinders working in connection with the upper gutta percha bowl, received a corresponding impression from them.

This machine in every respect fulfilled all the requirements set forth by the Manchester Committee as entitling the inventor to a Prize Medal; namely, novelty of invention, economy in working, and perfection or correctness in workmanship. The novelty was evidenced in the new arrangement of machinery, its application to a purpose never before attempted, that of printing simultaneously on both sides, and in the feature of the fabric receiving the impression from the naked surface of the bowl, without the interposition of any woollen web. The economy in working was established by the dis-use of expensive blankets and lappings, the saving of power effected, and the great durability and facility of repairing the bowls. The machine was made from my design by one of the first makers of printing machinery (the finish and correctness of whose workmanship was undeniable), and was valued at 400*l*.

However, the Jurors of Class 6, whose high office it was to examine with attention and impartiality into, and report upon, the several claims of the exhibitors, and to award to such as might be deemed deserving of notice their respective palm of merit, did not deign to bestow in their Report the slightest recognition of any merit in this machine, nor indeed did they take any notice of it at all; and while thus ignoring my claim, as an inventor, to the meed of approbation to which I was justly entitled, as some acknowledgment of the labour and expense I had devoted in bringing my work to a successful issue, they, with stranger discernment, award an honourable mention to a Mr. Mather, for an eight-coloured printing machine, which was never in fact exhibited, although it was announced for exhibition in the public papers.

It may seem egotistical in me to make this communication the opportunity for a detail of what I may consider my grievances at the hands of the Jurors of the Great Exhibition; but as I believe that the slight cast upon my invention by their undeserved silence in my regard has been injurious to my interests, by leading the public to consider the principle therein involved, as worthless and impracticable, I have thought it fitting on this occasion, while upholding and showing the application of a similar principle to the objects stated in your prospectus, to represent fairly the circumstances of that neglect, and abide by your verdict as to its justice.

In conclusion, I may add, that the same description of bowls, as I have applied to the purposes of printing, are with similar advantage applicable to other processes intimately connected therewith, as for bleaching, washing, finishing, &c., using them in the place of the ordinary wooden, cotton, paper, or other bowls. For all these purposes, their durability and elasticity of surface render them pre-eminently successful and economical. In bleaching, the resistance of the gutta percha to the action of both acids and alkalies, constitute an important feature. For squeezing, the strong resisting power and elasticity of surface enables them to squeeze out the watery particles more effectively from the fabric. For finishing, their smoothness combined with their other qualities, imparts to the cloth a softer and more mellow finish than can be attained with any other description of bowls.

J. DALTON.

## HOME CORRESPONDENCE.

### LECTURES.

Huntingdon, June 28th.

SIR,—Will you allow one of the numerous Representatives at the late Conference, who could not get a hearing, to express his sentiments with suitable brevity through the medium of your valuable Journal?

It was manifestly not the fault of the Chairman if many of the Representatives were unheard. That he was full of vigilance and courtesy, all who were present will testify; nevertheless, it so happened that the Representatives of the larger and better known Institutions succeeded in stating their case, and that those who were charged with the advocacy of smaller Societies were not equally fortunate. Yet it is surely in behalf of these that the aid of the Society of Arts is especially required.

The topic on which I, in common with many more, was anxious to speak was, What aid the Society may give to the affiliated Institutions in the important department of LECTURES?

Now, it seems to me clear that a distinct line of demarcation must be drawn between two classes of Institutions, which might, with almost sufficient accuracy, be denominated the *Northern* and the *Southern*.

In the towns, chiefly northern, where manufactures are carried on, it is found that lectures are at a discount. The young men of Oldham, "earnest in their pursuit of knowledge," cry out, "Meagre! Desultory!" and prohibit the "rambling dissertator" from entering their doors. If an Institution in a manufacturing town has lectures at all, they must be on Dr. Lyon Playfair's plan—a *systematic course*, and almost exclusively on those *physical sciences* in which, as manufacturers, the audience will take a deep interest. For the same reason, while lectures generally fail in those towns, *classes* almost always succeed; and, while science is carefully studied, literature and the fine arts are neglected, if not despised. For these towns, it is evident that scientific lecturers of the first class—"professional lecturers," as Archdeacon Freer said—are needful; and as the Society of Arts is quite competent to supply such lecturers, if only they can be adequately paid, I cannot see any difficulty in accomplishing the object: for flourishing manufacturing towns must surely be able to pay all that might be required. I would suggest, however, that it might possibly do them no harm, if it did not quite save them from the vulgar utilitarianism into which they are now in danger of falling, if an occasional lecture on some topic of literature or the Belles Lettres were even forced down their throats.

But for us who dwell in towns further south, who have not the luck to find in our Institutions or in society around us that high tone of cultivation which distinguishes the young men of Oldham, and who have no manufacturing necessities to make us love physical science more than anything else, a very different regimen seems desirable. We find that *courses* of lectures are pronounced a bore; and that *scientific* courses, above all others, are considered dry and uninteresting, unless enlivened with sparkling experiments, and delivered by men of very popular address. On the whole, those "desultory" dissertations despised at Oldham are found the very best things, if judiciously chosen, to whet the flagging appetite for knowledge. *We* like to hear George Dawson and Mrs. Balfour, and only wish that lecturers like them could be counted by the dozen. *That* would satisfy our modest requirements for the present; for hitherto we have had to choose between ignorant and conceited adventurers, who would "do the thing cheap," and only succeeded in exciting our spleen, and "professional lecturers," full of hard words and dry disquisitions, who indeed proved their own learning, but, alas! emptied both our lecture-room and our purse. In such a wretched dilemma we have been fain to have no lectures at all.

What I have, therefore, to crave is, that in making provision for our Lecture-rooms, the Society of Arts will kindly take into consideration the entirely different standing and position of the Institutions in the North and in the South. I remain, Sir,

Your obedient Servant,

JAMES HENRY MILLARD.

### LOCKS.

SIR,—I have never seen a more unfortunate attempt at getting out of a scrape, than the anonymous letter in the Journal last week, written almost avowedly by some member of that sagacious Committee which gave a Medal and something more to the inventor of a lock, which Mr. Hobbs has shown to possess the two qualities of antiquity and good-for-nothingness in an eminent degree.

They now pretend, at least their advocate does for them, that they understood—nay, that "it is evident, that what the Society desired was a good *common* lock." If so, do they think the Society could not have said so? If so, why did the Society say something as different as possible? If it is so evident, why does P. L. O. take so much pains to explain that the expression "great security" in the Premium List, must be understood to mean only as great security as you can expect for half-a-crown? The Prize List said nothing about half-a-crown, and did specify "great strength and security from fraudulent attempts," and also from "disarrangement by dirt," and that the lock was only to require a small key.

To anybody but Mr. Chubb and his Committee, this rather particular description must have suggested anything rather than a cheap common lock; but it did not to them,—at least so they assure us now. The fraudulent attempts, we are told, could not be supposed to have any reference to banker's safes, because you cannot expect a good bank lock for the price of a good common lock; and a common lock, we know, is the thing the Society meant to ask for. And therefore it is evident that the fraudulent attempts the Society had in view were the attempts of "the idle and mischievous" on "the store-room or apple-loft."

The freedom from "disarrangement by dirt" required by the Society's conditions, could not possibly suggest to the intelligent minds of Mr. Chubb's committee the idea of one of Mr. Chubb's locks having to be broken open on account of two of the tumblers having got stuck together,—Mr. Chubb, of course, never heard of such a thing. The expression no doubt suggested to them only the idea of a mischievous boy stuffing dirt into the lock of the aforesaid store-room, or apple-loft, by way of paying off the owner for being so ill-natured as not to leave it open.

"No one expected, as the result of the Society's premium," they say, "an unpickable bank lock for five shillings." Probably not: but there is a widish margin left between an unpickable bank lock for five shillings, and Mr. Chubb's pickable one for five pounds or thereabouts. If the Committee had no lock presented to them, which (as far as they could judge) did "possess great strength and security from fraudulent attempts, freedom from disarrangement by dirt, requiring only a small (that is, of course, a light) key, and *cheap*" *for a lock possessing those qualities*, which is the only rational meaning of the word, they had nothing to do but so to report to the Council. Or, if Mr. Chubb's committee did not choose to give any encouragement to a lock which might be likely to interfere with Mr. Chubb's locks, they might have given no premium at all, with at least as much credit to themselves as they have obtained by what they have done. Or, if they really meant to reward Mr. Saxby for cheapening the construction of an old lock, they might have done so, taking care to inform the public what their reward was for.

They did none of these things; but committed the gross blunder so properly and promptly exposed by Mr. Hobbs. And they now add to it the much grosser and more discreditable blunder of attempting to disguise it, by an excuse which everybody can see is a pure *ex post facto* invention from beginning to end. I think it due to the credit of the Society to expose such a proceeding as it deserves. If P. L. O. had put his name to his defence of himself and his colleagues, he should have had mine to this answer to it. As he has not, I take leave to subscribe myself, O. P. Q.

## LOCKS.

Tiverton, July 2nd, 1853.

SIR,—I should be sorry unnecessarily to trespass upon your columns; but the fact of the lock of Mr. Saxby, for which the Medal was awarded by the Council of your Society, having been proved by the successful experiment of Mr. Hobbs to be even ludicrously unsafe, renders it imperative on me, having been a competitor with Mr. Saxby for the Prize, to take this public means of disabusing the minds of the many persons at present cognisant of, or who may hereafter be acquainted with, the fact of my having so competed, of an opinion they must naturally form from the premises:—That the lock considered by the Committee to be the most deserving of the Prize having been shown to be utterly untrustworthy, mine consequently was in all likelihood equally, or supposing such a circumstance possible, still more insecure. That such is not the case, and that in this instance the Committee have in their desire to introduce a *cheap lock* attached too little importance to the still more requisite element of *perfect security*, I will (in order to vindicate the reputation of my lock from the stigma which must otherwise, in consequence of this error on the part of the Committee, rest upon it) venture to demonstrate in a manner at once conclusive and unquestionable, and which, under the present circumstances cannot, I think, be considered objectionable. I submitted it to the decision and criticism of the Society in the full confidence, not only that it would prove to be a "cheap lock," but *that it was not possible, by any amount of skill or perseverance, to succeed in picking it.* In such belief I still continue; and in order to convince my friends and the public that the decision in Mr Saxby's favour was not owing to any want of security in mine, I herewith publish my intention of placing the sum of 100*l*. in the hands of a banker, to be handed by him over to Mr. Hobbs, should he succeed within the next three months in picking the patented lock of my construction, which was placed before your Society in competition for the Prize. On receiving notice from Mr. Hobbs, through your Journal, of his intention to make the attempt, I will at once commence fixing it in a manner suitable for the experiment; on the completion of which, he shall be at liberty to examine a lock constructed on the same principle, that he may acquaint himself with its peculiarities, after which I will allow him ten days in which to effect his purpose: conditioning solely, that either myself or some person appointed by me, shall, if I shall so require it, be present during the operations, to prevent violence or injury to the lock. No other sufficient means being open to me but the present of removing whatever prejudice may have been created against my invention, by the erroneous decision of the Lock Committee, must be my excuse for thus occupying your space. I am, Sir,

Yours respectfully,
W. H. TUCKER.

## MR. SAXBY'S LOCK.

"Faith! here's an equivocator!"—*Shakspere.*

SIR,—Had your correspondent P. L. O. really afforded the "explanation and reply" promised in his opening paragraph, I should scarcely have troubled you with a rejoinder to his observations. Either I am not so "acute" as his flattering designation would lead me to suppose, or his "explanation" must be deficient in point and clearness; for I can neither see that it justifies the Committee on Locks, by whom the premium was awarded to Mr. Saxby, or that it corrects my opinion concerning the requisitions of the Society.

Not to occupy your space unnecessarily, I will simply repeat the words of the proposal made by the Society, and submit my own understanding of them for comparison with the judgment of P. L. O. The offer was made for "the invention of a good and cheap lock, combining *strength and great security from fraudulent attempts;* cheapness, freedom from derangement by dirt, and requiring only a small key." I supposed the above to mean that a lock was to be produced either on a new principle or by the arrangement of some principle already known, which should combine with as much strength as any lock now in use, as great or greater security, and yet be capable of manufacture at a lower price for the various purposes for which locks are required, and should require only a small key. If I am not mistaken in the plain import of the language, I may venture to repeat that the lock for which the Committee have awarded the premium of the Society does not in the most distant manner come up to the requisitions. Instead of its being either a new principle or a new arrangement, it is precisely the same *both in principle and arrangement* as the Cotterill lock, without the slightest modification, in fact, only differing from it in the inferiority of its workmanship. It is less secure than either a Bramah or a tumbler lock of the same cost, and is quite as liable to be deranged by dirt. It requires a key of the same size as the Bramah and other locks.

I make no comment upon the wisdom of supposing that the Society intended to award a premium for the means of securing P. L. O.'s "apple-loft" from the pilfering propensities of his naughty boys; the words are for *great security from fraudulent attempts*, and they need no commentary to make them plainer.

In conclusion, it would give me great pleasure to be afforded an opportunity of proving the correctness of my statement to the Society by a comparison of the different kinds of locks now in use. I am prepared to prove also that as good a lock cannot be produced by Mr. Saxby for half-a-crown as by Cotterill for 10s. In regard to "professional lock-picking," I will undertake to show that Mr. Saxby's lock can be easily opened and locked again, not by the application of extraordinary skill or anything so profound as "systematic ingenuity;" but by *a bent nail and a bit of wire*, or by a key made by a piece of pine wood; in a word, that the principle of Mr. Saxby's lock is neither secure for the "store-room, the apple-loft, nor the banker's safe;" that it is not "much more secure than common locks;" and that it cannot be produced at a lower price than "really good locks." This proposition being distinctly understood, your correspondent P. L. O. will have some difficulty in satisfying either the Society of Arts or the public that the Committee on Locks have not committed a very ridiculous blunder.

Respectfully yours,
A. C. Hobbs.

97, Cheapside, July 5th, 1853.

## CHRONOMETERS.

Sir,—Observing that Mr. Denison's object, in the discussion concerning chronometers, is to misrepresent everything connected with the subject, it is not my intention to take any further notice of his remarks.

Yours, &c.,
London, July 5. E. T. Loseby.

[*** We must now close this discussion. Both parties appeal to the same documents in support of their views. Those interested in these matters must draw their own conclusions from them.—Ed. J. of S. A.]

## TO CORRESPONDENTS.

In answer to several inquiries, the Secretary begs to state, that when any donation of books is made to the Society for distribution among the Institutions in Union, the fact is notified in the Journal immediately; and should the number of copies be limited, the Institutions desirous of possessing a copy of any particular work are requested to apply for it. These applications are registered immediately on their receipt, and the books are sent in the next parcel; it being thought preferable, in order to avoid unnecessary expense, not to send each work separately, but to detain them until several are collected.

Want of space prevents the publication this week of the usual list of Parliamentary Papers. Also letters from Mr. R. A. Slaney, on "Cottager's Wells;" from * * * *, on "Lecturers, Lectures, and Apparatus;" and from Mr. Thomas Restell, on "Locks;" as well as a notice of the Allenheads' Library.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette*, 1*st July*, 1853.

*Dated 7th May*, 1853.

1131. C. W. Finzel—Refining sugar.

*Dated 10th May.*

1141. F. Lipscombe—Obtaining motive power.
1151. J. H. Johnson—Apparatus for agricultural operations. (A communication.)

*Dated 26th May.*

1301. J. Nurse—Fastening and unfastening doors, specially applicable to carriages.

*Dated 27th May.*

1309. W. W. Bonney—Machinery for raising a pile by abrasion on cotton, linen, &c. fabrics.

*Dated 28th May.*

1313. E. Nash and J. Nash—Manufacture of wicks.

*Dated 1st June.*

1343. J. W. Thomson — Heating hothouses, &c., houses, churches, &c.

*Dated 3rd June.*

1364. J. Mayelston—Manufacture and refining of sugar.

*Dated 15th June.*

1445. A. Parsey—Revolving engine by steam, air, gases, or water.
1449. C. W. Williams—Manufacture of sheet-iron, &c., for boilers, vessels, &c.
1451. J. Dehan—Manufacture of yarn, and fabricating articles therefrom.
1453. J. Dilkes and E. Turner—Door-springs.
1455. W. Gossage—Obtaining certain saline compounds from solutions.
1457. T. Z. L. Maurel—Horological alarms.

*Dated 16th June.*

1449. E. Walmsley and J. Holmes—Improvements in steam-engines.
1461. W. Christopher and G. Gidley—Abstracting sulphur, &c., from vulcanized India-rubber.
1463. J. W. Gibson—New pavement for roads.
1465. J. Ilsley—Telegraphic apparatus.
1467. P. A. L. C. de Fontainemoreau—Process for preserving milk, &c. (A communication.)
1469. C. Roosevelt—Reducing friction of journals of railway and other carriages, &c.
1471. B. Finch—Apparatus for supplying steam-boilers with water.
1473. S. Solomon and S. Mills—Axle-boxes for locomotives, &c.

*Dated 17th June.*

1474. E. Rodgers—Looms for weaving.
1475. C. and E. Wand and W. Busfield—Preparing wool and other fibrous substances.
1476. A. E. L. Bellford — Machinery for pulverizing, &c., quartz or ore, and amalgamating gold therein. (A communication.)
1477. A. E. L. Bellford—Improved stove or kiln.
1478. R. Lister—Chimney-tops or flues.
1479. H. and J. Bleasdale—Working, tilling, and preparing land.
1481. J. Piddington—Obtaining infusions, &c., and vessels for same. (A communication.)

*Dated 18th June.*

1482. W. Hall—Shipbuilding.
1483. H. Bessemer—Waterproof fabrics.
1484. H. Saunders—Drying grass and other crops.
1486. E. Breffit—Manufacture of glasshouse pots.
1488. T. and W. Adamson—Pumps.
1489. J. and J. Heginbottom—Spinning.
1490. J. Shanks—Alkali from common salt.
1492. W. A. Gilbee—Ornamenting stuffs and paper. (A communication.)
1493. J. Worrall—Machinery for washing, bleaching, and dyeing fustians, &c., and other textile fabrics.
1494. J. C. Richardson—Machinery for winding yarn.
1495. J. C Richardson—Looms for weaving.
1496. G. Robinson—Apparatus for roasting coffee, &c.
1497. S. Schofield — Machinery for preparing and spinning cotton, &c.
1498. G. Young—Grinding wheat, &c.

*Dated 20th June.*

1499. C. Crickmay—Fire-arms.
1500. J. Paul—Colouring paper on the surface.
1501. R. Midgley—Preparing and finishing worsted yarns, and apparatus for same.

1502. H. Barker and F. Holt—Machinery for grinding and turning metals.
1503. W. Boggett and G. B. Pettit—Dioptric reflectors.
1504. W. and H. Hodgson—Machinery for spinning wool, hair, &c.
1505. J. W. Perkins—Manufacture of artificial manure.
1506. W. E. Newton—Machinery for drilling or boring rocks, &c. (A communication.)
1507. W. E. Newton—Manufacture of handles for knives, &c. (A communication.)
1508. C. L. Defever—Preparation for lubricating machinery.
1509. R. Cornelius—Construction of churns for butter.
1511. A. Macpherson—Disinfecting sewers, &c., and converting contents to useful purposes.
1513. P. Grimand—New aërogaseous drink, called "Grimandine."
1514. H. Blatin—Buckles.

*Dated 21st June.*

1515. C. Cowper—Cards or substitutes for cards for Jacquard loom. (A communication.)
1516. J. Newton—Apparatus for heating buildings, applicable to horticultural purposes, hatching and rearing game, &c.
1517. T. Wilson—Screens for cleaning wheat, &c.
1518. J. Drummond—Reaping-machine.

*Dated 22nd June.*

1521. J. H. Noone—Stopping trains and preventing accidents.
1522. F. Ayckbourn—Waterproof fabrics.
1523. F. Huckvale—Hand hoes.
1524. W. Geeves—Manufacture of bricks.
1525. C. Topham—Apparatus for measuring liquids, gases, &c., and for regulating the flow, applicable to obtaining motive power.

### APPLICATION WITH COMPLETE SPECIFICATION FILED.

1548. A. Andraud—Railways and locomotives for facilitating ascent of steep inclines. 25th June, 1853.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 1st July*, 1853.

Year, 1852:
955. William Keates, of Messrs. Newton, Keates, and Co., Liverpool—Improvements in fire-boxes for locomotives and other steam-boilers.

Year, 1853:
9. Matthew Tomlinson, of Hulme, Manchester—Improvements in the manufacture of species-jars or show-jars.
19. George Gwynne, of Hyde-park Square, and George Fergusson Wilson, of Belmont, Vauxhall—Improvements in treating fatty and oily matters.
21. Jean Baptiste Pascal, of Lyons, and 16, Castle-street, Holborn—Improvements in obtaining motive power.
28. Lieutenant Herbert Newton Penrice, R.E., of Sheffield—Improvements in propelling vessels.
215. Joseph Scott, of Glasgow—Improvements in closing or stoppering bottles, jars, and other receptacles.
253. John Mason, of Rochdale—Improvements in looms for weaving.
541. John Wright, of Camberwell—Improvements in machinery for manufacturing bags or envelopes of paper, calico, or textile fabrics.
581. Jacques Françisque Pinel, of Pall-mall—Improvements in deodorising sewage water and cesspools, and in manufacturing manures.
820. John Thomas, of Caen, France—Improvements in apparatus for the manufacturing of gas and coke.
969. James Davis, of Hemel Hempstead—Improvements in the manufacture of threshing-machines.
970. William Sager, of Seacombe, Chester—Improvements in machinery or apparatus for propelling vessels.
974. Cyprien Marie Tessie de Motay, of 24, Rue Fontaine St. George, Paris—Improvements in preparing oils, and in apparatus for burning the same.

*Sealed 4th July*, 1853.

Year, 1853:
17. Joseph James Welch and John Stewart Margetson, of Cheapside—Improvements in the manufacture of travelling-cases, wrappers, and certain articles of dress hitherto manufactured of leather.

*Sealed 5th July*, 1853.

20. William Edward Newton, of 66, Chancery-lane—Improvements in atmospheric engines. (A communication.)
24. Thomas Shilton, of Baddesley, Ensor, Warwickshire—Improvements in weighing-machines.
25. Charles Frederick Whitworth, of Brighton—Improvements in apparatus to be used in connection with railway-signals, for the purpose of indicating the approach of trains, and of preventing collisions.
30. Emile Grillet, of Soho-square—Improvements in renewing the teeth of files.
45. Thomas Pape, of Loughborough—Improvements in circular frames, and in the fabrics and articles produced thereon.
70. William Weild, of Manchester—Improvements in looms for weaving.
80. James Fletcher, of Facit, near Rochdale—Improvements in machinery applicable to spinning, doubling, and winding of cotton, wool, flax, silk, and other fibrous materials.
251. Louis Guillaume Perreaux, of Paris—Improvements in machinery or apparatus for testing and ascertaining the strength of yarn, thread, wire strings, or fabrics.
472. Thomas Browne Jordan, of New Cross, Kent—Improvements in machinery for planing slate.
602. Edward Maitland Stapley, of Lawrence-lane, City—Improvements in machinery for breaking and dressing flax and other fibrous materials. (A communication.)
880. François Felix Verdie, of Lorette, Loire, France—Improvements in welding cast steel with iron, steel, cast iron, and other metals.
943. Frederick Henry Smith, of 264, Borough of Southwark—Improvements in apparatus for cleansing the interior of tubular boilers and other hollow articles.
1032. Peter Fairbairn, of Leeds, and Ferdinand Kaselowsky, of Berlin—Improvements in machinery for drawing, roving, and spinning flax, hemp, and other fibrous substances.
1075. Richard Quin, of 5, Rodney-street, Pentonville—Improvements in the manufacture of cases for jewellery, for optical and other instruments, miniatures, and other articles.
1096. Thomas Taylor, of the Patent Saw-mills, Manchester—Improvements in apparatus for measuring and for governing the flow of water and other liquids.
1097. William Edward Newton, of 66, Chancery-lane—Improvements in apparatus for rolling iron. (A communication.)
1130. William Boggett, of St. Martin's-lane, and George Brooks Pettit, of Lisle-street, Westminster—Improvements in apparatus for heating by gas.
1147. Robert Brown, of 58, Waterloo-road, Liverpool—Improvements in lifting and forcing water and other fluids.
1157. Samuel Cunliffe Lister, of Manningham, Yorkshire—Improvements in treating and preparing before being spun wool, cotton, and other fibrous materials.
1175. Joseph Denton, of Prestwich—Improvements in machinery or apparatus for manufacturing looped, terry, or other similar fabrics.
1181. George Bertram, of the firm of William and George Bertram, of Edinburgh—Improvements in the manufacture of paper.
1184. Charles Tetley, of Skinner-street—Improvements in rotary engines.
1196. Herman Dirs Mertens, of Margate—Improvements in preparing materials to be employed in making beer and other beverages.
1207. Jean Emile Barse, of Paris—Improvements in the manufacture of grease or composition for lubricating the axles and moving parts of machinery.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| July 1 | 3480 | Portable Combined Chair and Couch. | James Ross Murphy and Patrick Murphy, trading under the name or style of E. Ross. | Dublin. |
| „ „ | 3481 | Joint for Bedsteads. | Duncan M'Laren and John Scott Oliver, trading under the firm of M'Laren, Oliver, and Co. | 329, High-street, Edinburgh. |
| „ 5 | 3482 | A Calendar, or apparatus for indicating the month, the day of the week, and the day of the month. | Thomas De la Rue and Co. | Bunhill-row. |

# SOCIETY OF ARTS.

**FRIDAY, JULY 15th, 1853.**

## MEETING OF COUNCIL.

*Wednesday, July 13th,* 1853.

At a meeting of Council, held on the 13th inst., the following gentlemen were elected to serve on the thirty Standing Committees of the Society, in accordance with the By-Laws, which require that each of such Committees shall consist of three members chosen annually by the Council; provided that one at least of every such three persons shall not, at any time during the previous year, have served on the Committee for the class in respect of which he shall be chosen.

### I. RAW MATERIALS.

Class I.—Mining, Quarrying, Metallurgical Operations, and Mineral Products.—Prof. D. T. Ansted, F.R.S.; W. Bird; T. Sopwith, F.R.S.

Class II.—Chemical and Pharmaceutical Processes and Products.—Dugald Campbell; Dr. Playfair, F.R.S.; C. Tomlinson.

Class III.—Substances used as Food.—H. Roberts; A. Waterhouse; Don Manuel de Ysasi.

Class IV.—Animal and Vegetable Substances used in Manufactures.—W. Parker Hammond; A. Smee, F.R.S.; G. F. Wilson.

### II. MACHINERY.

Class V.—Machines for direct use, including Carriages and Railway and Naval Mechanism.—W. B. Adams; J. G. Appold, F.R.S.; T. R. Crampton.

Class VI. — Manufacturing Machines and Tools. — Henry Hensman; C. W. Siemens; J. Whitworth.

Class VII.—Civil Engineering, Architectural and Building Contrivances.—J. Glynn, F.R.S.; C. H. Gregory; C. H. Smith.

Class VIII.—Naval Architecture and Military Engineering, Ordnance, Armour, and Accoutrements.—Capt. J. M. Adye, R.A.; W. W. Saunders, F.R.S.; H. Wilkinson.

Class IX.—Agricultural and Horticultural Machines and Implements.—G. Cottam; J. J. Mechi; Prof. J. Wilson, F.R.S.E.

Class X.—Philosophical Instruments and Processes depending upon their use; including Musical, Horological, and Surgical Instruments.—Rev. W. W. Casalet; J. Glaisher, F.R.S.; F. Seymour Haden.

### III. TEXTILE FABRICS.

Class XI. — Cotton Manufactures.—J. Allison; J. Jones; John Scott.

Class XII.—Woollen and Worsted Manufactures.—W. Barber; J. P. Bull; R. Milligan, M.P.

Class XIII.—Manufactures in Silk and Velvet.—F. Bennoch; S. Lewis; T. Winkworth.

Class XIV. — Manufactures from Flax and Hemp.—T. C. Hayward; W. Leaf; J. Wilkinson.

Class XV.—Mixed Fabrics, including Shawls.—T. Gaury; G. Hairs; J. R. Lavanchy.

Class XVI.—Leather, including Saddlery and Harness: Skins, Furs, Feathers, and Hair.—F. Leake; J. A. Nicholay; C. A. Preller.

Class XVII.—Paper and Stationery, Printing, and Bookbinding.—T. De la Rue; Charles Knight; C. Whittingham.

Class XVIII.—Woven, Spun, Felted, and Laid Fabrics, when shown as specimens of Printing or Dyeing.—A. Lapworth; W. Liddiard, jun.; J. C. Wakefield.

Class XIX.—Tapestry, including Carpets, Floor-cloths, &c., Lace, Fancy Embroidery, and Industrial Works.—Peter Graham; G. Pollock; G. F. Urling.

Class XX.—Articles of Clothing for Immediate Personal or Domestic Use.—J. D. Allcroft; Donald Nicoll; A. Salomons.

### IV. METALLIC, VITREOUS, AND CERAMIC MANUFACTURES.

Class XXI.—Cutlery and Edge Tools.—Heather Bigg; T. Weedon; R. Williams.

Class XXII.—Iron and General Hardware.—D. Aspinal; E. B. Denison; C. B. Warner.

Class XXIII.—Works in Precious Metals, Jewellery, Articles of *vertu*, &c.—J. H. Watherston; Joseph Angell; S. H. Gass.

Class XXIV.—Glass.—D. Pierce; Nathaniel Powell; Edward Wilson.

Class XXV.—Ceramic Manufactures, China, Porcelain, Earthenware, &c.—H. Cole, C.B.; J. Finch; W. P. Phillips.

Class XXVI. — Decorative Furniture and Upholstery, Paper Hangings, Papier Maché, and Japan Goods.—John Bettridge, jun.; J. G. Crace; S. M. Hubert.

Class XXVII.—Manufactures in Mineral Substances used for Building, or Decorations, as in Marble, Slate, Porphyries, Cements, Artificial Stones, Clay, &c.—Frank Franklin; Prof. Tennant, F.G.S.; G. F. White.

Class XXVIII.—Manufactures from Animal and Vegetable Substances, not being Woven, Felted, or Laid.—R. T. Fauntleroy; N. Lindley; T. I. Miller, M.P.

Class XXIX.—Miscellaneous Manufactures and Small Wares. W. De la Rue, F.R.S.; R. Hendrie; Capt. Laffan, M.P.

### V.—FINE ARTS.

Class XXX. (*a.*)—Sculpture, Modelling, Carving, &c.—John Bell; Hon. E. C. Curzon; H. Weigall.

(*b.*)—Painting, Engraving, &c.—F. S. Carey; T. Creswick, R.A.; B. W. Hawkins.

(*c.*)—Architecture.—R. D. Chantrell; G. Mair; W. Tite, F.R.S.

(*d.*)—Stained Glass, Enamels, Mosaics, &c.—M. R. Hawkins; H. Portens Oakes, M.P.; Capt. F. E. Wilmot, R.A.

The Council then considered the question of the re-appointment of the Institutes' Committee. It appeared that nearly all the members of that Committee had now been elected into the Council; and the Council being of opinion that it would tend to the more prompt transaction of the business, that it should for the future be undertaken by the Council, it was Resolved not to re-appoint a separate Committee for Institutes' business.

The following Institution was taken into Union:

280. Norwood Library and Reading-room.

## NOTICE TO INSTITUTIONS.

The Council have much gratification in announcing that, pending their negotiations with the publishers, they have received a communication from the Representative of the late Colonel Gurwood, offering to the Institutions in Union copies of the well-known "Despatches of the Duke of Wellington," published at eight guineas, in eight volumes, royal octavo, bound in cloth, for four guineas. The Council wish particularly to call attention to this favourable opportunity of obtaining on very liberal terms a work which, they presume to say, should be found in every public library. They will receive orders for the work, which should be accompanied by a Post-office order for four guineas, and will arrange for its prompt transmission.

## FRENCH EXHIBITION OF 1855.

With reference to the discussion which took place upon the French Exhibition of 1855, at the meeting of the Society on the 1st June, we understand that a despatch has been received by Lord Clarendon, that goods, the importation of which is now prohibited, will, if shown at the approaching exhibition, be admitted at an *ad valorem* duty of thirty per cent.

## THE PAPER DUTY.

### QUERIES PROPOSED BY THE SOCIETY OF ARTS, MAY 4th, 1853.

### No. 2.—To Wholesale Stationers.

The following are the replies which have been received to the second set of Queries on this subject; and are published in continuation of those given last week.

### 1. Does the Tax affect injuriously the quality and varieties of Paper as supplied by the Manufacturer?

Messrs. Brown and King say, "We do not think it does."

Messrs. Cripps and Starkey say, "Not at all."

Messrs. Dixon, Marsden, and Hall say, "This is a question for the manufacturer, rather than the dealer. So far, however, as we are able to judge, we think it does."

Messrs. Dobbs, Kidd, and Co. say, "Not at all, that we are aware of."

Messrs. Healey and Co. say, "We are paper manufacturers, and make the largest quantity of mill-boards by quite double any other makers in England, &c. We know the tax does not interfere with the quality, &c., as supplied."

Messrs. Hyde and Co. say, "There cannot be two questions on this matter; it does."

Mr. S. Magnus says, "I think not."

Mr. D. Natowski says, "Decidedly."

Messrs. J. W. Pouncey and Sons say, "It affects injuriously the thickness of papers; consumers being tempted to use too thin papers in consequence of the increased price caused by the duty, which is on weight. A far more serious evil is caused by the duty and the Excise regulations attending it, through the checks they give to experiments, which would lead to improvements in qualities, and production of varieties, applicable to purposes not yet thought of. A total repeal of the duty, by leaving the manufacturer at liberty to employ his ingenuity fully, would probably be followed by important consequences."

Messrs. Spalding and Hodge say, "No."

Messrs. Venables, Wilson, and Tyler say, "We do not consider that it does so in any manner."

Messrs. Wiggins, Teape, and Co. say, "No."

### 2. Does it interfere with the quantity?

Messrs. Brown and King say, "It may, partially."

Messrs. Cripps and Starkey say, "By no means."

Messrs. Dixon, Marsden, and Hall say, "If by this question is meant, 'Would the consumption increase if the duty were repealed?' we have no hesitation in replying that it would increase very greatly."

Messrs. Dobbs, Kidd, and Co. say, "No."

Messrs. Healey and Co. say, "We consider it might probably interfere with the quantity of brown paper and other common papers used, but not in the least with printing or writing paper."

Messrs. Hyde and Co. say, "All fiscal imposts have the effect of restricting the manufacture; none more so than the paper duty."

Mr. S. Magnus says, "I think there would be more made, but by little makers; consequently, of inferior quality."

Mr. D. Natowski says, "Yes."

Messrs. J. W. Pouncey and Sons say, "Yes; by increasing price it diminishes consumption; and it is right to observe that the Excise regulations referred to above tend to increase price beyond the duty itself; and we believe that ⅓*d.* per lb. (one-third of the duty) would not be more than sufficient in some cases to pay the manufacturers for the evils of those regulations."

Messrs. Spalding and Hodge say, "No."

Messrs. Venables, Wilson, and Tyler say, "No; as the Excise do not interfere with the manufacture."

Messrs. Wiggins, Teape, and Co. say, "No."

An Anonymous Correspondent says, "Yes; many goods that foreign manufacturers pack up in paper, are in England merely tied or strung up; and when packed in paper, a common or thin quality is used."

### 3. Does it prevent the ready and economical employment of capital invested in the Trade?

Messrs. Brown and King say, "We think not."

Messrs. Cripps and Starkey say, "It does not."

Messrs. Dixon, Marsden, and Hall say, "Among the manufacturers, certainly; but not among dealers."

Messrs. Dobbs, Kidd, and Co. say, "We think not."

Messrs. Healey and Co. say, "We do not think it interferes with the economical employment of capital, but we know it prevents many business men from going into the trade, on account of the risk the duty involves; and consequently makes mill property more hazardous."

Messrs. Hyde and Co. say, "The effect of the Excise duty on paper has been to drive out of the market the men of small means and much ingenuity. The trade is yearly becoming more and more restricted; in fact, a monopoly in the hands of a few men of large capital, &c."

Mr. S. Magnus says, "I think not."

Mr. D. Natowski says, "I have no doubt of it."

Messrs. J. W. Pouncey and Sons say, "This is a difficult question to reply to. That it embarrasses the employment of capital may be inferred from the previous answers; but it must be allowed that the credit given by the Excise for the duty enables a manufacturer to make the duty the means of capital, disadvantageously to the real capitalist."

Messrs. Spalding and Hodge say, "Not at all."

Messrs. Venables, Wilson, and Tyler, say, "Not in any way."

Messrs. Wiggins, Teape, and Co. say, "No."

### 4. Does it produce disappointment in the execution of orders, from the delays occasioned by the Excise regulations?

Messrs. Brown and King say, "In some instances very seriously."

Messrs. Cripps and Starkey say, "To so trivial an extent, that it is scarcely worth notice."

Messrs. Dixon, Marsden, and Hall say, "Constantly."

Messrs. Dobbs, Kidd, and Co. say, "We do not find that it does."

Messrs. Healey and Co. say, "Very little indeed: you can charge paper one day, and send it to town, or elsewhere, the following morning, which is soon enough."

Messrs. Hyde and Co. say, "It (the duty) does cause considerable delay in the execution of orders; the manufacturer is fettered to a considerable extent, and has not free scope in his trade."

Mr. S. Magnus says, "Very seldom. In writing to a manufacturer, if the paper is made, it can be sent in a very *few hours* after the order is received."

Mr. D. Natowski says, "Undoubtedly."

Messrs. J. W. Pouncey and Sons say, "Yes. It causes unnecessary loss of time in the delivery of papers from the mill; and we have known orders refused for papers required in great haste, on account of the delay which might be caused by the Excise regulations."

Messrs. Spalding and Hodge say, "Sometimes. This is the worst objection to the tax."

Messrs. Venables, Wilson, and Tyler say, "At the present time, the utmost delay it can occasion is twenty-four hours, the time required for it to remain after being charged with duty; this delay is counteracted generally by the exertion of the maker to have it charged *so much* (twenty-four hours) before the conveyance intended to take it to its destination is ready to start."

Messrs. **Wiggins, Teape,** and Co. say, "No."

### 5. Would the removal of it lead to an extended demand from abroad?

Messrs. **Brown** and **King** say, "Not to a great extent, the drawback on export being already allowed."

Messrs. **Cripps** and **Starkey** say, "Not in the least."

Messrs. **Dixon, Marsden,** and **Hall,** say, "We think not to any great extent, drawback being now allowed upon all paper exported."

Messrs. **Dobbs, Kidd,** and Co., say, "We cannot see that it would, as the drawback now allowed enables us to export as freely as if there were no tax at all."

Messrs. **Healey** and Co. say, "We most certainly think not. France and the United States are free, and no doubt chiefly supply foreign markets, and still would be able to do so cheaper than us. Besides, we get the drawback, and always sell foreigners the paper less the duty, the same as though never imposed."

Messrs. **Hyde** and Co. say, "The price of paper has lately increased, and is increasing. We depend, to a considerable extent, on foreign markets for rags. The removal of the duty just now would, it is presumed, be a most judicious step; as from the large demand, home and foreign, we might, were so absurd and onerous an impediment to the ready employment of capital and men's brains removed, now begin to beat all our foreign competitors, and supply, without fear of successful competition, the greater portion of the civilized world."

Mr. S. **Magnus** says, "I think the reverse, as, should the duty be repealed, the price of paper would not generally be reduced the full amount of the duty, which we receive as drawback."

Mr. D. **Natowski** says, "There can be no question of it."

Messrs. J. W. **Pouncey** and **Sons** say, "In no other way than as it leads to diminish demand generally."

Messrs. **Spalding** and **Hodge** say, "No, for the drawback is allowed."

Messrs. **Venables, Wilson,** and **Tyler,** say, "None, because at present the full amount of the duty is allowed to the exporter at shipment."

Messrs. **Wiggins, Teape,** and Co., say, "No."

An **Anonymous Correspondent** says, "We find a great deal of trouble and annoyance in packing paper for export, and getting the drawback. We do a great deal of business in the Channel Islands, and can state for a fact that paper sent there by ourselves and other houses pays nearly *double profit*, which is necessary to remunerate houses for loss of time and trouble in getting the drawback. The Excise regulations prevent *small and frequent* consignments, and give the foreign maker an advantage, as he can ship direct to the shopkeeper or consumer, while it only answers in England to consign to large dealers."

### 6. Does the Excise mark upon each ream of paper, which is always above the real weight, and for which the manufacturer has an allowance, lead to mistakes and disputes between the stationer and consumer?

Messrs. **Brown** and **King** say, "We think not, now being generally understood in the trade."

Messrs. **Cripps** and **Starkey** say, "No, it does not, being an understood thing throughout the trade."

Messrs. **Dixon, Marsden,** and **Hall,** say, "This is a most vexatious and unwise regulation; the consumer considering himself defrauded by the paper weighing less than it is marked, while the manufacturer and stationer, knowing that the 'marking up,' as it is technically called, is allowed by the Excise, think they do no wrong. It becomes the more vexatious from the circumstance of some manufacturers not availing themselves of the privilege of 'marking up,' and from the fact of a certain class of papers, which are always sold by *weight*, and not at a *ream price*, being often made to weigh considerably more than they are marked. It will be seen at once that this want of uniformity of practice must produce great confusion, misunderstanding, and dispute."

Messrs. **Dobbs, Kidd,** and Co., say, "We have never found it does in a single instance."

Messrs. **Healey** and Co. say, "This is particularly the stationers' wish, and I am not aware of any inconvenience arising from it. It would, as a rule, be better for the manufacturer to sell scale weight."

Messrs. **Hyde** and Co. say, "As retail stationers, buying our paper in the folio, cutting it up into various sizes before it reaches the consumer, we cannot give a correct opinion on this point. Printers, who buy in large quantities, know (and ascertain) what the real weight should be, and, we presume, have no difficulty in getting any error rectified."

Mr. S. **Magnus** says, "No; the generality of consumers seldom know anything about weight; they buy by the ream."

Mr. D. **Natowski** says, "This is continually the case. Disputes and unpleasantries frequently occur between the stationers and tradespeople, in consequence of the weight marked on the wrappers exceeding the actual weight."

Messrs. J. W. **Pouncey** and **Sons** say, "The manufacturer has no allowance on account of the marked weight on the Excise label; he pays for the real weight; the marked weight may be below as well as above the real weight. Many reams are weighed at one draught, but every ream of the draught may not weigh alike; and some papers also lose and some gain weight by time. On these accounts a per centage (five per cent.) departure from the real weight is permitted. A practice has grown up of generally marking a weight greater than the real weight, and buyers are often deceived thereby into supposing the paper to be heavier than it really is."

Messrs. **Spalding** and **Hodge** say, "Not necessarily. When it does, it is the stationer's own fault." They also add, that the statement that the manufacturer has an allowance for the mark being above the real weight is incorrect.

Messrs. **Venables, Wilson,** and **Tyler,** say, "Very rarely, because it is generally known to consumers that the Excise allow the weight marked on the ream to be five per cent., and not more, in advance of real weight. Without this regulation of the Excise there would doubtless be much greater cause for disputes and differences of weight."

Messrs. **Wiggins, Teape,** and Co., say, "Yes."

### 7. Please to state any facts relative to the above, or any other points bearing on this inquiry.

Mr. C. D. **Collet** says, "You will find very few wholesale stationers in favour of repealing the duty; they have all the *poor* manufacturers under their control, as the latter, having only six weeks' credit for the duty, are always in want of ready money. The stationers will not allow a paper-maker in the country to sell directly to a bookseller in London."

Messrs. Healey and Co. say, "We consider a stationer is not the person to apply to in this manner, as most people are governed by interest, and we are inclined to think that wholesale stationers would prefer the duty to remain upon the paper; but Chambers, Knight, Bohn, &c., &c., would prefer it off."

Messrs. Hyde and Co. say, "*Good paper* is dear, and the price has a still further tendency to advance. The penny postage, joined to the reduction of the duty from 3*d.* to 1½*d.*, gave a great impetus to the paper trade. We are on the eve of an imperial if not a universal application of the penny postage system, and on the eve of a comprehensive system of education of the million. For these and many other reasons, all fiscal imposts on the manufacture of that article by which the world is civilized should be at once removed. Such is the demand at present for various qualities of paper, that orders cannot be executed; but if years ago this Excise duty had been *in toto* repealed, we should have found no such difficulty in execution of orders. There is now no difficulty in buying corn at a reasonable price, nor would there have now been so restricted a supply of paper consequent, in great part, on so limited a number of makers as compared with former years."

Messrs. J. Uncey and Sons say, "For the full investigation of the effects of this duty, it is fit that it should be known that the greatest importation of paper for home consumption is of a paper (extra thin bank post) where the duty is trifling, forming a very small proportion of the value, and not of thick paper, where the duty would often amount to twenty-five or thirty per cent. It is not creditable to English manufacturers that they have not succeeded in beating the foreign manufacturer in this as they have in other papers."

Messrs. Spalding and Hodge say, "The abolition of the duty would not probably lower the price materially. An increased demand for paper would raise to an exorbitant price the raw material, the supply of which is already becoming daily more inadequate."

Messrs. Venables, Wilson, and Tyler, say, "We are of opinion that if the duty was taken off, the public (the masses) would derive little or no advantage from it. All the cheap publications would remain the same price still; the daily papers might be reduced, but not the weekly ones, neither educational books; and the reduction on paper to any but *large* consumers would be of trifling value, not appreciable."

An Anonymous Correspondent says, "The duty is 14*s.* 8*d.*, on which the maker, agent, wholesale dealer, and retailer have to charge a profit; so that the consumer pays fully double that amount, and in some instances more. The retail profit on *writing paper* is large, and the duty fully 4*d.* or 6*d.* per pound to the consumer."

## PRIZE ESSAY ON LITERARY, SCIENTIFIC AND MECHANICS' INSTITUTIONS.*

The Essay for which Mr. Hole has obtained the Society's Medal, and a premium of 50*l.*, is divided into four chapters, treating respectively of the History of these Institutions; the Objects and Methods of Adult Instruction; Business Management of Institutions; and Union of Institutes. It comprises also six Appendices, reproduced from various sources, being the evidence at length, on several topics discussed in the Essay. They are, A. Memorials to the Royal Commissioners, praying for the Establishment of a Central Institution of Arts and Manufactures. B. Amusements. C. Subjects which ought to be known in various trades. D. Exhibitions of Works of Art, &c., &c. E. Itinerating Libraries for Villages. And, F. Museums.

The history of Mechanics' Institutes is briefly given; and it is considered, that whatever may be thought of them as educational establishments, they have certainly helped to form a sound public opinion as to the necessity and duty of popular education. The large circulation of their books has cultivated a taste for reading; and the cheap concerts originated by the Manchester Mechanics' Institution, have created a popular feeling for good music; their lectures have facilitated the progress of social and sanitary reform, as by these means people have learnt some little about ventilation, about draining, about smoke-consuming, and other practical matters. While politics are excluded, newpapers are not; and hence the tone of thought on many political subjects has become elevated. The primary objects, however, of their establishment have not been attained, as they have failed to attract the mechanic class (using the term in its generic sense, as including all classes of operatives), and to impart scientific instruction. One great and general cause of this state of things, "is the deficiency of elementary training for children. The adult has to commence that process in the Institution, which ought to have been completed before he entered its walls, and the time which he should be spending in the temple of knowledge, is taken up in mastering the keys of its portals." Other causes may be traced to the miscellaneous character of the subscribers; to the changes which took place in the Institutes between the years 1830—2, owing to political causes; and to the means adopted to revive the prestige then lost. The establishment of Lyceums, or People's Institutes in which there was a larger share of the amusing, and to which the subscription was less than one-half, induced a corresponding change, though to a limited extent, in the Mechanics' Institutes; hence they became less strictly educational, and their means for doing good were curtailed. The three principal methods employed by them for the diffusion of knowledge,—the library, the lectures, and the classes, are then severally discussed; the reason assigned for the failure of lectures being, "that the people very often derive no real *advantage* from them," as they bear "no relation to the previous acquisitions of the auditory," and are frequently but "a series of experiments, the reasons and nature of which are scarcely apprehended, still less remembered, by the listener." * * * "The most valuable lectures are those which partake of the nature of class instruction. The course on any subject should be sufficient in number to enable the teacher to convey adequate information on the principal leading points; and it should be accompanied by either written or oral examinations, and frequent reviews of past lessons. A course of winter lectures so pursued would have results far more valuable than any number of miscellaneous lectures."

The concluding paragraphs of this chapter are devoted to the question of female education, which was probably not contemplated by the earlier founders of Mechanics' Institutes, and in which direction no great advance has since been made. After quoting from the Report of the Secretary to the Huddersfield Female Institute, Mr. Hole closes this part of the subject by remarking:

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* "An Essay on the History and Management of Literary, Scientific, and Mechanics' Institutions; and especially how far they may be Developed and Combined so as to promote the Moral Well-being and Industry of the Country." By James Hole, Honorary Secretary to the Yorkshire Union of Mechanics' Institutes. Published under the sanction of the Society of Arts. 8vo. Longman and Co., 1853.

reference to domestic servants, that "we have tried the system of ignorance, and *that* fails; let us try *that* of knowledge and kind treatment, and see if that will work a change."

The second chapter, which treats of the objects and methods of adult instruction, discusses the twofold character of education necessary for the artizan: general, so as to make him a better man and a better citizen; and industrial, so as to make him a more able and more productive workman. Our deficiency in the latter respect is strongly commented on, and many quotations are given from Dr. Lyon Playfair's lecture on Industrial Education on the Continent, corroborative of this opinion. The Edinburgh School of Arts is pointed to as a good model, and it is considered that "there is nothing in its programme which might not at once be adopted in all Institutes in the large towns, and, in part, in many of those of the smaller ones, if only the means existed of providing adequate instruction." At present "the smallness of the number of scholars in adult evening classes arises from want of teachers rather than scarcity of those who need teaching, and are willing to be taught." The provision therefore of properly qualified and properly paid teachers is the first essential, and as there is even now some difficulty in obtaining teachers for elementary instruction, it is feared that for that of a more advanced character this difficulty might amount to an impossibility. It is recommended that examinations and certificates of proficiency should be established as soon as the educational machinery is once placed on a proper footing. It is proposed that in place of discontinuing the lecture system altogether, the number of miscellaneous lectures should be diminished, and be substituted by one or two complete courses during each winter session, on those branches of science for which it was found impossible to provide regular class instruction. Though the introduction of disputed topics into Mechanics' Institutes is inadvisable, yet it is thought that they "*need not* be indifferent to questions affecting the social interests of the working-classes. That they *are* so is one great cause of their present inutility; but to their more intimate participation in those interests, we look for their power increasingly to attract the working-classes." Other methods in which Institutions may operate beneficially in the elevation of the people are then treated of, the establishment of news-rooms, the formation of clubs for providing amusement and recreation, occasional exhibitions, and adopting the system of Penny Savings Banks.

The business management of these Institutions, which forms the subject of the third chapter, chiefly relates to their financial position; and it is said that "the first step required to render these Institutes adequate to the purposes aimed at, is to *increase the means at their disposal.* Unless this is done, we see little chance of their improvement. There are three sources from which such an increase may be derived: 1st, the contributions of the working-classes themselves. 2nd, the donations of the wealthy; and 3rd, aid from the State." In regard to the present rate of subscription, it has been found that "in one little village where the management of the Institute happens to be good, as much as 13*s.* per head per annum is contributed; while scores of Institutes with from twice to ten times the population, hobble on with about 1*d.* per week, or 4*s.* per annum from each member." Now, experience indicates that the amount obtainable from the working-classes might be much increased by taking it in small sums. "In the Huddersfield Institute the payments are fortnightly. A pound per year paid weekly, or at short intervals, would be far less formidable than paid at yearly or half-yearly periods, though both modes of payment should be adopted." To the People's College at Sheffield, the working-classes paid 6*d.* per week, and 1*s.* per quarter in addition.

Another source of revenue is the contributions of the wealthy. It has been urged that these Institutions *ought* to be self-supporting, on the same grounds that it is said that "men *ought* to be virtuous, religious, &c., &c.;" but "we might as well refuse our contribution to the Missionary Fund, 'because the Blacks ought to evangelize themselves,' as refuse aid to Mechanics' Institutes because they ought to be self-supporting. When the savage *is* converted, he will support his own church; so when the working man *is* educated, he will support his own college; and to this standard we should endeavour to attain." * * * "Institutions meant to teach mainly the operative classes, and offer good elementary training, like the Huddersfield Institute, or scientific instructions, like the Edinburgh School of Arts, cannot be self-supporting NOW, whatever they may ultimately become. The Huddersfield Institutes' income last year was 650*l.*; of which sum 143*l.* was derived from persons who do not directly participate in the benefits of the Institution, and 507*l.* from the fees of the pupils. The average annual fees from the Edinburgh School of Arts do not amount to above *half the actual expenditure*, the rest being contributed by the wealthy inhabitants of the city; without which, say the Directors, 'it could not be carried on a single session.'"

In regard to the third source of aid, it is thought that "efficient class instruction in the arts and sciences, and all appliances requisite to make that instruction effective, should be provided by the State where the means are deficient," and that the best available mode of doing this would be by a Parliamentary Grant. The advantages of a day-school in connection with an institution are strongly insisted on, as "the pupils, being admitted to the privileges of the Institution, learn to appreciate its advantages, and are likely to prove its firmest supporters." Besides, the Directors could then obtain a grant from the Committee of Council on Education in aid of the Building Fund. The Patricroft Institute, near Manchester, received a grant of 300*l.* out of an expenditure of 1,000*l.* in this way. The other points alluded to in this chapter are, the necessity for the regular collection of the unpaid subscriptions; that the work of the Institute should be paid for, and be done properly; that every available means should be used to keep the Institute constantly before the public; that its management should be as popular as possible; and above all things, that there should be an absolute avoidance of debt.

The chapter on the Union of Institutes, so peculiarly interesting to the Society of Arts at the present time, closes the Essay. After a cursory glance at the American Unions, and a short narrative of our own provincial Unions, most of which have become extinct, the question is asked, Why have these Unions not accomplished more? In reply, it is affirmed, that this must be attributed to their want of means, and to the opinion prevalent with the conductors of Institutions that for every farthing subscribed to a Union, an immediate equivalent should be returned. The advantages which a Union of Institutes should confer are stated to be of a twofold nature; first, those which belong to the general interests of all such Institutes,—a central body, acting for the general interests of adult education, urging the formation of Institutes where none at present exist, and improving less advanced Societies; and second, those which have special reference to each individual Institution. It might give important aid by the establishment of itinerating village libraries. It should secure adequate attention to the welfare of such Institutions on the part of the Legislature, of which two illustrations at once suggest themselves; the necessity for some Act to protect their property, and punish fraud and dishonesty, and the re-affirming the Act 6 and 7 Vict., c. 36, granting exemption to such Societies from local rates and general taxation. A thorough system of keeping their accounts in the best and simplest form is much desired; as is also a perfect code of rules. A National Union might issue a catalogue, or list of books, which would be valuable "not merely as suggestive of works to be bought, but, if judiciously done, as a guide in the selection."

Of the direct advantages which such an organisation might confer upon the individual Societies, first in importance is the Lectures. "There are two methods of economising the expense of lectures. One is by reducing the payment to the lecturer himself,"—a plan which is deprecated; and the other method "is that of arranging the engagements of the lecturer;" all that can be saved in this way being true economy. But if this organisation were perfected to the utmost, the lecturing system would not even then be brought to its highest state of efficiency. Scientific and practical lectures do not answer, pecuniarily speaking, so well as those of a lighter class; and the consequence is, that there is a strong inducement to discard them altogether. Now, it is in this branch that the Government assistance is essentially needed; and if it were given, "a large amount of systematic instruction in practical science might be conveyed." This plan has already been adopted in Ireland, with very great success. The Government grant of 5,000*l.* a year to the Royal Dublin Society to provide localities with lecturers, the locality visited having to defray a small portion of the expenses, has been attended "with very great success." One course in each session might be so supplied, and the remainder of the list could be filled up with gratuitous lectures, to be delivered by persons residing in the locality, who should be assisted by diagrams and apparatus furnished by the Union. Skeleton and manuscript lectures should also form a portion of its stock. "If the lectures are arranged to be delivered in the Institutes according to their geographical position—and no other plan is so economical of time, labour, and money—the arrangement of the order in which the places are visited *must rest with the managers of the Union, not with the committee of the Institute.* The utmost power that can be allowed them, is the negative one of declining any course of lectures." By its aid, too, local exhibitions might be materially assisted, "not only by furnishing contributions, but also by organising skill to bring them together;" and the formation of local museums—an object of great importance, and one which the Society of Arts has already dealt with—might be promoted by the exchange of specimens between different localities; a system which had produced most successful results in America.

In conclusion, Mr. Hole remarks that "nothing would more effectually disarm the hostility, secret or avowed, of the opponents of popular education, than a recognition of their [the Institutes'] objects by the State in the way recommended. It would also tend to attract the highest order of talent, both literary and scientific, to their lecture halls, and season the mediocrity which prevails there. Superior lectures would bring the middle ranks, superior class instruction would draw the operatives to the Institution; and thus a common ground whereon they could meet would be secured, and a friendlier, healthier feeling between the employer and the employed be promoted."

The above is a summary of the principal points alluded to in the Essay, which, it will be seen, contains much valuable information and many useful hints. It would be well that all Managers of Institutions, and others interested in their advancement, should make themselves thoroughly acquainted with the experience and practice here recorded.

## HOME CORRESPONDENCE.

### LECTURERS, LECTURES, APPARATUS.

SIR,—Referring to the Conference held at the rooms of the Society of Arts, on the 9th ultimo, I wish to express my acknowledgments for very many valuable suggestions which emanated from some of the Representatives present on that occasion. As might have been expected, there were various opinions on similar subjects, and different plans for accomplishing the same objects. Local circumstances, and habits, and experiences must be expected to exercise this kind of influence. At such a meeting it would be difficult so to extend the sphere of observation, and to generalize the subjects proposed for discussion, as to make men forget the individuality of each Institution. Whilst professedly and sincerely desirous of devising measures in which all could co-operate, by which all, in some degree, would be benefited, and to which all could cordially assent; there must necessarily be the promptings of something very much like self-interest,—a wish that all Institutions may prosper, but that ONE in particular might be the most prosperous.

For a period of more than twenty years I have known something about gratuitous lecturing; and, in common with many others, I have become familiarized with its toils and its pleasures, its rewards and—to complete the list, I suppose I must add—its discouragements. Still, I am disposed to look at the bright side. The discouragements have been few and unimportant; and if fairly weighed against past and prospective advantages, and in which others have not participated more largely than myself, I think they scarcely deserve the name I have given them.

My sole object, in obtruding a few thoughts on your attention, is with the hope of so setting before you the value of the services of gratuitous, or call them, if you please, amateur lecturers, that in any recommendations under the sanction of the Society of Arts, this useful class of labourers should not be overlooked. If I had been only an observer or a listener—anxious that a greater measure of success might be realized by Literary, Scientific, and Mechanics' Institutions—but without having put my hands to the work, or experienced any of the difficulties incident to the enterprise, I should not have ventured in this way to express my views.

Closely connected with, and, indeed, inseparable from the number and qualifications of lecturers, are the subjects on which they discourse, and the apparatus (tools?) they work with in illustrating and simplifying their themes. A few words on each of these topics will, I hope, fall by-and-by, into their proper places.

LECTURERS.—As a general principle I consider it an element of vitality, and one of the surest guarantees of usefulness and prosperity, that in Provincial Institutions there should be every possible amount of encouragement given to local (amateur) lecturers. This, of course, requires wise and judicious management; but wherever it is done, one of the main objects of the Institution is in a fair way of being realized, namely, the instruction of the younger members is secured, and by an instrumentality that will insure a constant supply of willing and efficient teachers.

There are exceptive cases; but they are, comparatively, few in number. In some large towns, and other (supposed) favoured localities, where there is a good supply of literary and scientific men, it has been impossible, properly and legitimately, to sustain an Institution. Extraordinary efforts have been found necessary to keep out of debt; and in looking after the financial, there has been a sad neglect of the scientific, department. These are some of the difficulties, and they have rather increased than diminished. It is here especially that wise counsels and practical suggestions are most needed.

Looking at the number of members, the amount of subscriptions, the receipts and disbursements, the sums received for one class of lectures as contrasted with others, the newspapers and periodicals purchased, and the books circulated, is quite proper and absolutely necessary. This, however, is the lowest ground; and admitting that it must be carefully surveyed, let it not be forgotten that there are other and more important objects, which can only be seen by a wider range of vision, and at a greater elevation. If these voluntary Institutions throughout the empire are to continue to take part in the instruction of the people—(I will not say *education*—because I am not sure it is the right word); if they are to assist in dispensing exactly the kind of knowledge which their members most need, and at that particular period of life when they have no opportunities for obtaining it elsewhere; then is it deserving serious consideration how such Institutions shall be made permanently self-supporting, how they shall get a stronger hold upon those friendly to progress; and, as might then be expected, how they may be made more generally useful. Whatever be the process—whether by means of gratuitous or paid lecturers; whether by district or county organization, or by separate efforts; or a friendly amalgamation of some or all of these systems, certain it is that provision must be made for a larger amount of local elementary teaching—especially in the principal branches of natural science.

The necessity for this could soon be shown. I have never heard it denied. How it is to be accomplished by any of the instrumentalities which seem to have occupied the thoughts of the Institutes' Committee, and some of the Representatives, is not at present very apparent. We may be told that the teaching to which I have referred ought to precede the attendance on public lectures; that it must form a part of the educational process in schools; and that every system of education which does not include instruction in elementary science must be pronounced defective. It is easier to talk about these things than it is to do what we know and feel to be so necessary. Those who reason in this way have very little reason on their side. They require to know more of the practical working of by far the greater number of Institutions, before they will be competent to form a correct opinion. If we wait until *School* instruction shall supersede the necessity for *Institute* instruction, we may safely leave the matter where it is, to be thought about and cared about by the next generation.

It is not likely that the services of gratuitous lecturers have been intentionally ignored; but I agree with Mr. Turrell (see Journal, No. 30, p. 373), that the value and importance of their services were not properly recognised. Such neglect is very likely to produce "a feeling of discouragement." No new or additional sources of discouragement are required. The Society of Arts should do all they can to help those whom Mr. Turrell describes as having "mainly contributed to the promotion of national intelligence, and on whose exertions the country has *chiefly* to depend." Let the Society try to make their work easier, and, as far as it can be done, more agreeable. This will stimulate to renewed exertions, and these in due time will receive their reward. The field is large—the workmen are few. There should be no jealousies, no fears of over-crowding, no unnecessary interference with each other's spheres of labour. Whilst there is work enough, and room enough, for all, let us try and understand the duties and proper positions of all. Local (gratuitous) lecturers can scarcely expect to luxuriate in overflowing audiences and deafening cheers. Let them not be disheartened. The initiative still remains with them. They have helped to make professional (paid) lecturers; and when the latter shall have been multiplied twenty or fifty-fold their less practised, but not less earnest, amateur fellow-labourers will still have plenty to do. It will be no discredit to them then, any more than it has been in former days that they still constitute a (literary and scientific) corps of sappers and miners.

LECTURES.—A judicious selection of subjects, and appropriate illustrations, are equally important as an efficient staff of lecturers. Leaving ample margin for the general literature of history and biography, of invention and discovery, of music, poetry, and topics purely, or partly, imaginative; there should be a certain number of lectures every year, and in every Institution, on some of the branches of elementary science. These should be made as attractive as possible by varying the experiments, and by exhibiting every new fact as it is made public. One of the most important uses of Institutions is to impart this kind of instruction to many who are just entering upon the practical realities of life. In some instances only a very brief period is at their command, and, where there is a desire to improve it, the period is generally found too short. Hence the necessity for a little scientific training, for the young almost exclusively, season by season; lest any should miss an opportunity, which, once lost, may never return. If this object can be accomplished by class-instruction so much the better. In some cases it has been tried and failed—in others it has succeeded. Class-instruction implies class-teachers. These are not everywhere to be had.

As lecturers on scientific subjects, every encouragement should be given to the young. If they have a taste for science, and are willing to improve their opportunities, they should be helped in their efforts. Nothing, I think, could be more acceptable, or likely to do greater service to Institutions, than a series of lectures, say twelve to twenty, on the branches of natural science which can be most easily and effectively explained and illustrated by popular teaching. In the first trial, and not to incur too much expense, there may be only some general directions—an outline sketched by a skilful hand, and, on that account, the more likely to be properly filled up. I believe the plan would succeed, and that the Society of Arts would soon find its parental duties increase. From outline there would be only a short step to more complete lectures, comprising directions about the preparations for experiments, the apparatus to be employed, and engravings to illustrate the effects to be produced.

APPARATUS.—This is another of the difficulties. To expect to have expert lecturers without a proper supply of apparatus, is like asking an artificer to do a job of work without his tools. Here the assistance of the Society of Arts is again required; and in this particular department its aids and influences may be most beneficially employed.

A practised lecturer knows that when his subject is susceptible of illustration, about four or five well-chosen, and skilfully-performed, experiments are sufficient. It is this which gives the professional lecturer some advantages as compared with the amateur. With his lecture, by frequent repetition, stereotyped on the mind; with an ample stock of apparatus, and the facility which experience alone imparts in the use of it; we might feel surprise, and something like disappointment, if one could not get through his work more easily than the other. Let me not be misunderstood. There are numerous exceptions to this rule. Many amateurs in science are well supplied with apparatus, and are as capable of using it for the benefit of others, as any who are paid for such services.

The cost of apparatus, the unfitness of a great deal of it for popular illustration, and the want of exactly that kind of practical skill in purchasing and preserving it, operate as hinderances to its more general distribution as a part of the instructional *materiel* in Institutions. How are these difficulties to be got over? I believe it is in the power of the Society of Arts to remedy the evil. Why not offer a prize for sets of apparatus adapted to different classes of subjects, made at a moderate price, and on a scale commensurate with the object? It is quite possible to illustrate many of the most interesting and important facts in natural philosophy by simple and inexpensive apparatus. Something should be done, and done quickly. Diagrams, tabular statements, and models are as necessary as apparatus. Everything should be on a large scale, capable of being seen at a distance, and by many persons at once. Let there be earnest efforts and co-operation—let the Society act upon the principle of helping those who are anxious to help themselves—let all things be conducted in a spirit of kindness, liberality, and, at the same time, real, as distinguished from false economy—and I venture to hope we shall soon be able to say in these matters, that the "good time" is not "coming," but that it has "come."

* * * *

Brighton, July 4th, 1853.

## COTTAGERS' WELLS AND PUMPS.

Walford Manor, Salop.

SIR,—I beg to give you the results of my experience in obtaining convenient supplies of water for labourers' cottages, by very simple and inexpensive, but effective means, to the adoption of which I have been led by becoming acquainted, during my connection with successive Sanitary Commissions, with the absolute necessity of an adequate supply of water to the poor, within a moderate distance from their homes. In some parts of Shropshire such supply is very indifferent, the cottages being far off from any well, and the labourers having to go half a mile to a surface spring: the consequence is, that they have to carry the water to their houses day after day, with much trouble and loss of time. The cost and cartage of bricks, and the labour attending the construction of large draw-wells of four feet in diameter, are obstacles alike to the large and small farmers, that prevent such works being carried out beyond certain limits, and executed in those positions where only small supplies are required by the isolated cottager. In many of these cases only small supplies of water are required at once; and the springs, though only shallow, have a sufficient interval of time allowed them to regain their level. There are also many soils, not containing stones or beds of rock, which are easily cut into, and also at moderate depths yield the supplies of water thus required; such soils are those of a sandy, marly, clayey, or gravelly character. Into these, wells may be sunk to a depth varying from three to seven or eight yards, at points conveniently situated for one or two cottages, at a sum (including every expense of the pump and the sinking of the well) not exceeding from 3*l.* 10*s.* to 5*l.* The spot for the well having been selected, and a small circular space dug into the ground as a preliminary process, the sinking of the well itself is commenced by making a vertical opening a few feet deep by means of the ordinary boring auger, or cylindric scoop, three inches in diameter, which not only penetrates the ground, but brings up the soil which is detached and enclosed. An iron cylinder, half an inch thick in metal, five inches clear in its internal diameter, and four feet in length, having its lower circular end brought to a sharp bevelled edge, to penetrate the ground, with a collar or rim of wood, cordage, or some other soft substance, fixed over its upper end to prevent vibration, is then placed over the opening thus made, and driven down into the ground by means of a heavy wooden mallet. The auger is again employed to remove all the earth enclosed by this iron cylinder; and, in order to obtain a further downward-passage for the cylinder, a tool is used to loosen and clear away the earth from beneath its cutting rim: this consists of a rod with a cross-handle at its top, and a projecting claw fixed at a right angle to its lower end; so that on turning this tool round by its handle, the claw turns round also beneath and beyond the sharp edge of the cylinder, which is again beaten down by the mallet and the earth removed by the auger. The requisite number of successive cylinders are placed one upon the other, and beaten down as the lower one descends. The well in this manner is generally completed in a single day, provided all the preparations for it have been duly made. Its sides are encased from top to bottom by the iron cylinders in question. The bottom of the well is formed of a bed of gravel, shot down, when the water has begun to come, to the depth of a foot, which acts as a filter for the ascending water. The lowest iron cylinder has a portion of its sides pierced with small holes to admit a lateral supply from the surrounding soil. The pump, with its spout turned down and covered with a grating, and its leaden pipe of half an inch to an inch bore (supplied to me by Caswell, of Snow-hill, Wolverhampton), are then inserted, and the well-top is covered over as usual; the lower end of the leaden pipe, of globular shape, and pierced with holes, being let down into the water immediately above the bed of gravel. I have found the expense of such well and pump, about seven yards in depth, not to exceed 3*l.* to 5*l.*; and I understand that in cases where a greater number is contracted for, the expense might be still less. I think it is evident that pumps of this nature, with the implements and cylinders for forming the wells in question, could easily be conveyed in a cart at a very small expense; and although I feel great confidence in the success of the form of well I now venture to describe, I make the communication in the hope that such improvements may be suggested in its form and structure as will tend to its still further economical manufacture and convenient adaptation to its purpose. In these small wells and pumps, the water is constantly removed, and not allowed to remain stagnant sufficiently long to act upon the metal. I have not heard of any complaint of such impregnation in the pump-water. It is not used by the cottagers for washing, a pit or pond being generally at hand, where there is a collection of soft water. The leaden pipes in these wells admit of being at any time easily drawn up and examined. I have understood from Professor Way that the plan of Dr. Smith, of Manchester, has been adopted in many towns in Lancashire for coating iron. The tubes are made red hot, and then dipped into a liquid bituminous mixture, which gives them a strong and beautiful coating of japan. Perhaps this plan might be adopted in reference to the lowest cylinder of these pumps.

R. A. SLANEY.

## LOCKS.

SIR,—On perusing in the Society's Journal a letter from Mr. Hobbs, who has obtained notoriety for his mechanical skill in opening or picking locks, manufactured by those who have hitherto been allowed to occupy the highest position in that branch of mechanism, I beg to state, that I was not aware (until I saw the above) that a premium had been offered for a good and cheap lock, or I should have been a competitor for the honour.

I have invented and patented a lock, which I do not hesitate to say, is the strongest, the simplest, and yet the most secure, and least liable to become injured by dirt, &c., of any others ever made; it is sold for 5*s.* and less, and although so low in price, I have no objection to Mr. Hobbs trying his professional skill upon it, using as many instruments, and of whatever kind he may please to select.

That gentleman is quite aware of having been invited on more than one occasion to try his skill upon the "English Protector Lock." He is conscious that it is exceedingly simple in its arrangement, having no detectors—no catch under the bolt, or loose stump as in his own, or any obstruction of the usual kind as a preventive to the bolt's passage. Standing alone—it possesses an original simple principle, distinct from all other locks. Unlike all other cheap locks, I guarantee this to be as secure as the most expensive. I cannot agree with your correspondent, P. L. O., that a lock, which in a few minutes may be picked, can be by any arrangement proved to possess great security; for the object of any lock, however moderate its price, and of any improvement in one, must, when practically and commercially considered, be to produce this result, namely, equal security, although at a diminished cost.

The originality of the principle upon which the English protector lock is contrived, consists in it being impossible to fix up the tumblers in succession as in other locks; for, after raising one tumbler, the attempt to do so with a second necessitates the fall of the first. A portion of the bolt is always jutting against a steel cylinder working in the top and bottom of the lock. This cylinder is so placed that it is impossible to move the key, or any instrument inside the lock, without, at the same time giving motion to it; and in any attempt to pick the lock, this cylinder will always prevent the bolt being pressed against the tumblers, thereby destroying the power to fix them in any particular position. It is only when the tumblers are all raised by the key to their exact position that the portion of the bolt described above can advance, and upon doing so, it passes under the key and enters the cylinder, filling an opening in it. It will therefore be readily understood, that supposing a false instrument be introduced, the tumblers will not be raised to their required situation; and, although one may be fixed, a second cannot be; for, immediately the attempt is made to remove the instrument in use, for the purpose of introducing others, motion is given to the cylinder, and, necessarily the bolt, immediately causing the fixed tumbler to return to its original position. It is only an instrument exactly like the key which will produce any effect, and of course one like the key would be the key, therefore, not picking the lock.

The above lock is made in unlimited quantities; without having any two locks the keys of which would suit each other.

Excuse my remarking, in conclusion, it is not *single* unpickable locks which manufacturers of locks care about, although they may be very interesting mechanical curiosities. It is to have an exceedingly simple and yet never-failing preventive to any one who endeavours to pick a lock, being able to ascertain the required position of the tumblers to effect this object. This preventive should be of one uniform shape or configuration, so as to dispense with mental labour on the part of the workmen, and thus enable quantities to be made at a price. The variation of each lock should consist solely in the tumblers, or in the depth of the notches in the key.

I am prepared to show, whenever it may be required, that *no lock has yet* been brought into manufacture by Mr. Hobbs, or any one else, which will equal the *English* protector lock in bearing an enormous amount of pressure upon the bolt.

After stating these advantages, I trust I may be acquitted of egotism, in believing this lock fulfils every condition required by the Society; viz., uncommon strength, and freedom from disarrangement by dirt, and at no risk to its security. It is sold at a price which challenges comparison with any unpickable lock of the day.

I am, Sir,
Yours respectfully,
THOMAS RESTELL.

## LOCKS.

Sheerness, 9th July, 1853.

SIR,—The question of the propriety of awarding the prize to me for the lock, is one which belongs, of course, to the Society, and not to the inventor. I should, however, feel greatly obliged if you will make the following explanation public.

The Committee were satisfied that the idea was original to me, and I care not to disabuse the minds of other persons who may believe the poor mechanic to be guilty of piracy. As a general rule, it is not such as we who live on the wits of our fellows.

The only part of Mr. Hobbs' first letter on which I think an explanation is due, is that which refers to the insecurity of my lock against fraudulent attempts. Now, Sir, I must plead as my defence, that I did not conceive the idea until about a fortnight before the specimen was due, and could not apply myself for more than half an hour at a time to its manufacture, and not being a locksmith, I had the rudest tools imaginable. The consequence was that the specimen illustrated the principle, but did not defy the ingenuity of Mr. Hobbs, who had previously examined it, and discovered that neither the notches nor the rim were accurately made, either in form or corresponding dimensions. Had they been so, he would have had much more difficulty in succeeding.

Allow me to suggest that the comparison Mr. Hobbs is so desirous to make for the information of the Committee, might be of some advantage to himself. If Mr. Hobbs has ever seen Cotterill's lock (and I believe he has), he must be aware that the statement made in the

Journal of June 24th is altogether untrue; viz., "that my lock is precisely the same, both in principle and arrangement, as Mr. Cotterill's, without the slightest modification in fact, only differing from it in the inferiority of its workmanship." All this is untrue; and if no Member of the Committee requires to be enlightened by the comparison, Mr. Hobbs probably may.

It would have sounded somewhat strange if Mr. Hobbs had stated this one fact in connection with the above, that when Mr. Cotterill made him a very liberal offer if he would pick one of his locks, he declined, thinking it wiser to wait a little.

It is scarcely necessary to remind the public, that Mr. Hobbs is not the only individual capable of estimating the quality of locks; nor O. P. Q., who has at least made one discovery, viz., "that of course a small key is always a light one;" nor Mr. Tucker, who has got 100*l*. more than I have to spend in convincing the public that his lock and not mine should have got the prize.

Other men equally competent to form an estimate of it have assured me that of 100 persons who could easily pick a common lock, 99 would fail in picking mine were the parts accurately fitted; which might readily be done with the necessary machinery at a low price. Hence there is an advantage over common locks of 99 per cent. in point of security.

I am, Sir,
Your obedient Servant,
H. G. Saxby.

## PROCEEDINGS OF INSTITUTIONS.

Allenheads.—On the 29th ult., Mr. Sopwith delivered a lecture to the members of the Library and Newsroom, on the subject of Benefit Societies, illustrating the origin of Tontines 200 years ago, and explaining the several tables of Expectation of Life, drawn up at different places. The accumulation of interest at 3 and 5 per cent. was exhibited by large diagrams, and the general principles of insurance companies explained. The large room, recently built for the accommodation of the miners as a reading-room and library, was completely filled, and the attention of every one present evinced how much they were interested in the subject. Mr. Sopwith drew especial attention to the excellent principle on which the patronage of Mr. Beaumont is bestowed; viz., by giving a donation of 5 per cent. on each year's current contributions, and 2 per cent on all properly invested funds; thus enabling the funds to accumulate at the rate of 5 per cent., by which in forty years the amount of accumulation is more than doubled, as compared with the ordinary interest of 3 per cent.

Portsmouth.—The Annual General Meeting of the members of the Portsmouth and Portsea Athenæum, was held in the Lecture-room, Bishop-street, on Monday evening. By the Report read by the Secretary, the financial affairs of the Institution appeared to be in a more prosperous state than they were at the last anniversary. Dr. Rolph was unanimously re-elected President of the Institution, and the following gentlemen as Vice-presidents: Messrs. J. Sheppard, G. Rylands, Rev. H. Hawkes, B. Bramble, T. Henderson, and J. Blake. The Rev. H. Hawkes having declined to serve as Vice-President, Mr. H. Lewis, being the next on the list, was declared elected. Mr. J. Horsey was re-elected Treasurer, Mr. Godfrey Secretary, and the following gentlemen as the Committee: Messrs. Rushbrook, Totterdell, Snook, Purchase, Andrews, O'Reilly, Hawkes, Moxon, Absalom, Digby, H. Emanuel, Cole, Howell, Stroud, Gore, Garnett, Falkner, Sothcott, Rockwell, Batchelor, J. White, Salisbury, Grover, and Pine.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the Journal regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

"J. S., Islington."—The second prize for an "Essay on the History, &c., of Literary, Scientific, and Mechanics' Institutions," was *not* awarded.

## MISCELLANEA.

Collection of Samples of Raw and Partly Manufactured Produce.—Her Majesty's Commissioners for the Exhibition of 1851 have just presented to the Society of Arts one of the thirty collections of Samples of Raw and Partly Manufactured Produce, which have been formed to meet the views of the Foreign Commissioners, who expressed a desire to be supplied with samples of British produce. This collection is confined, with very few exceptions, to the first four classes into which the Exhibition of 1851 was divided—namely, Class I. Mining and Mineral Products; II. Chemical and Pharmaceutical Products; III. Substances used as Food; IV. Vegetable and Animal Substances used in Manufactures; to which is added XXVII. Manufactures in Mineral Substances. It comprises 708 specimens, contained in twelve trays. The specimens have, in all cases, been furnished gratuitously; each contributor having been asked to send such samples of the articles exhibited by him in 1851 as he considered it was most desirable should be known in foreign countries. It will be remembered, that at the close of the Exhibition of 1851, the Royal Commissioners invited the exhibitors to furnish samples of the produce exhibited, with a view to their being preserved in some suitable place, and ultimately forming the nucleus of a collection of the various products of human industry of all periods and countries, to be arranged with strict reference to their commercial utility. This was referred to in the Second Report of the Commissioners, and it is now believed that some progress is being made towards the realization of such a plan.

Detection of Iron Shillings and Sovereigns.—By applying a small pocket magnet to a counterfeit coin of the above kind, it is instantly attracted, and may thus be lifted up from a table, whereas genuine coins are unaffected. A delicately-suspended magnetic needle is a still more sensitive indicator.

Cold Water Steam-engine.—Yesterday afternoon we visited the machine shop of Messrs. Burge and Johnston, to witness the performance of a new engine, styled as above, and recently invented by Mr. Edward T.

Tippett. The steam is produced without boilers, by simply injecting cold water into generators. The amount of steam required to force out or return the piston-rod is made by the introduction to the influence of the fire at each moment of precisely the quantity of water needed, thus doing away with the necessity of boilers. It is claimed that there is no possibility of an explosion, that greater power is obtained, and less room occupied for the necessary machinery. The water falls into the engine, being first raised by a force-pump into a reservoir situated above the engine, and thence inducted down as wanted. The engine is a singularly constructed piece of mechanism, both in appearance and mode of operating. *—Cincinnati Gazette.*

**Paper Houses.**—Messrs. Bielefield have lately erected at their works near the Staines station of the South Western railway, several very neat cottages, commodious stores, and handsome villas, the whole of which, with the exception of the frame-work, the doors, and the flooring, which are of wood, are composed of papier maché. It is said that these houses, which contain from four to ten rooms each, can be taken down and re-erected within six hours; and that though it is thought they will be as durable as brick, their cost will be little more than one-third. The houses are all made with hollow walls, thereby excluding damp, and affording the means for ventilation. In the East Indies, the timber can be dispensed with, and the whole constructed entirely of papier maché, which from its poisonous nature is not liable to be attacked by the white ant.

**The East-Indian Salt-Tax.**—From a petition which has just been presented to Parliament from the Bristol Chamber of Commerce, it appears that the cost of salt to the East India Company is at the rate of ¼*d.* per pound; to this the Company add a profit at the rate of ¾*d.* per pound, and suffer the dealers to traffic in the article, so that eventually the cost to the consumer is about 2¼*d.* per pound, or 21*l.* per ton. Now the tax imposed by the Company on salt imported into India is said to be equivalent to the profit of ¾d. per pound, so that a monopoly is established for this prime necessary of life to the disadvantage of the poor ryot of India; indeed, it appears from statistical accounts which have been published, that the quantity of salt consumed in India is less than one-half that consumed in this country, relatively to the population, it being about 12lb. per head per annum in the former; and 25lb. per head per annum in the latter. The first cost of salt in this country does not exceed one-sixth of that manufactured in India; and the price to the consumer here is but about 30*s.* per ton, instead of 21*l.* per ton, as in India. If the tax and the monopoly were abolished, it is believed that salt manufactured in England could be exported and sold in Calcutta at from 40*s.* to 44*s.* per ton.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 29th June*, 1853.

596. Durham Election—Minutes of Evidence.
665. Bills—Brecon Collegiate Church (as amended by the Select Committee.)
651. ,, —Parish Constables.

*Delivered on 30th June.*

574. Water-Rates—Return.
566. County Treasurers—Abstract of Accounts.
631. Poor Relief—Return.
640. Tubular Life-Boat—Copies of Correspondence.
684. Customs—Return.
685. Westminster Improvements Bill—Special Report.
671. Bills—Assistant Judge (Middlesex Sessions)
673. ,, —Land Revenues.
686. ,, —Leasing Powers (Ireland), as amended by the Select Committee, on re-commitment, and on consideration of Bill as amended.

*Delivered on 1st July.*

557. Juvenile Offenders—Abstract of Return.
575. Steam-vessels, "Pharos," &c.—Return.
647. Public Works (Ireland)—Return.
688. Bills—Elections (amended).
689. ,, —Sheriff Courts (Scotland) as amended in Committee, and by the Select Committee, and on consideration of Bill as amended.
690. ,, —Public Houses (Scotland), amended.

*Delivered on 2nd and 4th July.*

552. Corporal Punishments (Navy)—Return.
659. Bankruptcy Bill (Lords)—Minutes of Evidence.
694. Lough Erne Drainage—Copy of Report.
587. Clare Election—Report from Committee.
644. Hayleybury College—Copies of Correspondence.
699. Bills—Lunatics' Care and Treatment (amended).
670. ,, —Lunatic Asylums (amended).
672. ,, —Customs.

*Delivered on 5th July.*

416 (1). Rye Election (Further Inquiry)—Index to the Minutes of Evidence.
643. Vestry Meetings—Return.
652. Taunton Election (Second Case)—Report from Committee.
696. Bill—Belfast Municipal Boundaries (as amended by the Select Committee.)

*Delivered on 6th July.*

635. Workhouses (Ireland)—Return.
658. Lighthouses (Guernsey)—Return.
679. Improvement of Towns (Ireland)—Return.
706. Trade and Navigation—Accounts.
697. Bills—Charitable Trusts.
699. ,, —General Board of Health, No. 3.
709. Stamp Duties (No. 1), amended.
Colonial Land and Emigration Commission—Thirteenth General Report.

*Delivered on 7th July.*

614. Encumbered Estates (Ireland)—Return.
678. Towns (Ireland)—Return.
680. Property Tax (Metropolis)—Return.
682. Civil List Pensions—Annual Account.
702. Divine Service (Army)—Return.
714. Customs Officers (Canada)—Return.
710. Bills—Stamp Duties (No. 2), amended.
711. ,, —Public Houses (Scotland), as amended in Committee, and on consideration of Bill as amended.
712. ,, —Thames Embankment (as amended by the Select Committee).

*Delivered on 8th July.*

513. Poor-Law—Abstract of Return.
646. Ordnance—Returns.
708. Bill—Savings Banks (amended)
Republic of the Equator—Treaty of Friendship, Commerce, and Navigation.

*Delivered on 9th and 11th July.*

415 (1). Mayo Election—Index to Minutes of Evidence.
497 (1). Plymouth Election—Ditto.
595. Clare Election—Minutes of Evidence.
509 (1). Berwick-upon-Tweed Election—Index to Minutes of Evidence.
676. Graving Dock, Dublin—Copies of Correspondence.
667. Metropolitan Commission of Sewers—Return.
701. Poor Relief (Ireland)—Return.
726. Landlord and Tenant (Ireland)—Copy of Papers respecting Roman and Foreign Law.
407. (1). Public Works (Bengal, &c.)—Return.
716. Bills—Factories.
718. ,, —Expenses of Elections (as amended in the Committee and on re-commitment.)
721. ,, —Succession Duty (ditto.)
724. ,, —Coinage Offences (Colonies).
731. ,, —Encumbered Estates (Ireland) Act Continuance.
Emigration (North American Colonies)—Papers.
Public General Acts, Cap. 26, 27, 28, 29, 30, 31, 32, 33, and 34.

*Delivered on 12th July.*

491 (1). Income Tax—Return.
681. East India Proprietors, &c.—Returns.
722. Bills—Entry of Seamen.
723. ,, —Naval Coast Volunteers.
735. ,, —Ministers' Money (Ireland).

*Delivered on 13th July.*

707. Post Office—Return.
733. Bills—Tenants' Improvements Compensation (Ireland), as amended by the Select Committee, and in Committee.
734. ,, —Courts of Common Law (Ireland), as amended in Committee on recommitment, and on consideration of Bill as amended.
735. ,, —Ministers' Money (a corrected copy.)
Public Works (Ireland)—Twenty-first Report from the Board.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

***From Gazette, 8th July*, 1853.**

*Dated 5th Feb.*, 1853.

322. A. M. Massonnet—Improvements in alloys, &c., and application of same.

*Dated 21st May.*

1258. W. Chisholm—Purification of coal-gas, and obtaining therefrom ammonia and sulphur.

*Dated 30th May.*

1326. G. Wells—Materials for suction-hose, mill-bands, &c.

*Dated 7th June.*

1394. G. B. C. Leverson—Springs for carriages, &c. (A communication.)

*Dated 13th June.*

1434. G. A. H. J. Fermin—Construction of steam-boats.

*Dated 23rd June.*

1526. G. L. Stocks and T. Watson—Ships' square-sails, and reefing same.
1527. N. N. du Chastaingt—Improvements in bread-making.
1528. J. Burrows—Steam-boilers and furnaces.
1529. J. Burrows—Formation of metallic plates, to be joined by riveting, &c.
1530. T. W. Dodds—Manufacture of files, rasps, &c.
1532. J. Aspinall—A self-adjusting lamp. (A communication.)
1533. M. J. Cooke—Mill for crushing and grinding bones, grain, &c.

*Dated 24th June.*

1534. J. Horton—Steam-boilers.
1535. J. Rock—Spring or clasp knives, &c.
1536. N. C. Richardson—Improved capstan.
1537. G. S. Sidney—Improvements in jugs, &c.
1538. J. Webster—Distillation of fatty and oily matters.
1540. J. H. Johnson—Motive power. (A communication.)
1541. J. H. Johnson—Manufacture of flour.
1542. J. H. Johnson—Machinery for cutting paper, &c.
1543. J. M'Connell—Consumption of smoke.
1544. J. Lyle—Manufacture of figured fabrics.
1545. H. Goodall—Machinery for grinding or levigating various substances.
1546. Leon Valls—Production of printing surfaces. (A communication.)

*Dated 25th June.*

1547. D., A., and H. Illingworth—Machinery for combing wool, &c.
1549. J. E. Lightfoot—Manufacture of a colouring matter for dyeing.
1550. G. J. Mackelcan—Corn-dressing machines.
1551. A. Sandoz—Solar watch. (A communication.)

*Dated 27th June.*

1552. R. Harlow—Valves for baths, washstands, &c.
1553. R. A. Brooman—Printing designs, &c., on stuffs, &c. (A communication.)
1554. W. Fairclough.—Looms.
1555. J. Mason and L. Ryder—Machinery for preparing and spinning cotton, &c.
1556. A. V. Newton—Manufacturing resin oil. (A communication.)
1557. G. French—Axles and axletrees.

*Dated 28th June.*

1558. J. Jarman—Apparatus for measuring corn, pulse, &c.
1560. A. Brown—Cotton fabrics for ladies' underdresses.
1562. A. E. L. Bellford—Magneto-electric machines. (A communication.)

*Dated 29th June.*

1564. T. E. Irons—Manufacture of lasts and machinery for same, &c.
1566. P. A. L. C. de Fontainemoreau—Construction of furnaces. (A communication.)
1568. R. M. Sievier—Manufacture of piled fabrics, and machinery for same.
1570. G. A. Biddell—Apparatus for cutting vegetable and other substances.
1572. J. Tatlow and H. Hodgkinson—Improvements in smallware looms.

APPLICATION WITH COMPLETE SPECIFICATION FILED.

1589. John Jaques—Chess-boards and chessmen. 2nd July, 1853.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 8th July*, 1853.

Year, 1853:

75. John Petrie, junior, and Samuel Taylor, of Rochdale—Improvements in machinery or apparatus for washing or scouring wool.
87. John Capper, of Manor House, Earl's-court, Old Brompton, and Thomas John Watson, of 3, Devonshire-terrace, Fulham-road — Improvements in preparing and bleaching jute and other vegetable fibres.
93. John Rumley, of South Shields—Improvements in pumps.
109. John Arrowsmith, of Bilston — Invention of a certain new or improved pumping machinery.
180. John Stevenson, of Dungannon — Improvements in machinery for spinning flax and tow.
312. George Letts, of Northampton—Improvements in machines for cutting and mincing meat and other materials for sausages and other like purposes, and for filling the prepared skins with the meat and other materials when so cut.
421. Charles Watt, of Selwood-place, Brompton, and Hugh Burgess, of 27, Grove-terrace, Kentish Town—Improvements in coating iron with copper and brass.
467. William Johnson, of 47, Lincoln's-inn Fields—Improvements in the treatment or manufacture of caoutchouc. (A communication.)
765. John Carter Ramsden, of Bradford, Yorkshire—Improvements in looms for weaving.
812. George Purcell—New method of adjustment in the art of printing, by means of certain combinations of various-sized spaces and quadrats.
906. John Wallace Duncan, of Grove-end Road, St. John's-wood—Invention of certain new combinations of gutta percha with other materials, and the method of applying such for use.
1010. John Hetherington, of Manchester, and John Dugdale and Edward Dugdale, of Blackburn—Improvements in constructing and applying models or patterns for moulding, preparatory to casting iron, brass, and other metals for various purposes.
1029. John Hetherington, of Manchester—Improvements in machinery for combing cotton, wool, silk waste, flax, tow, and other fibrous substances.

*Sealed 9th July*, 1853.

62. John Stewart Duncan, of Charing-cross—Improvement in rendering bottles, jars, and other like receptacles air and water-tight, and for raising and measuring the liquid contents thereof.
63. John Dean, of Whitstable, Kent—Invention of a new construction of diving helmet.
65. William Webb, of 5, Princes-street, Spitalfields—Improvements in the manufacture of carpets.
67. Frederick Schneider, of Berne, and 16, Castle-street, Holborn—Invention of a chair to be employed for preventing sea-sickness.
68. Alfred Vincent Newton, of 66, Chancery-lane—Invention of an improved mode of separating substances of different specific gravities. (A communication.)
898. Moses Robinson, of Brussels—Improved means for preventing accidents on railways.

*Sealed 12th July*, 1853.

78. Nathaniel Card, of Manchester—Improvements in candle-wicks.
82. John Arrowsmith, of Bilston—Invention of new or improved machinery for shaping metals.
88. Frederick and Alfred Lawrence, of City Iron-works, Pitfield-street, Old-street Road——Improvements in sluices and lock-gates.
90. Moses Cartwright, of Longton—Improvements in the preparation or manufacture of gypsum or plaster of Paris.
91. Charles Bullivant, of Birmingham, and Charles Hackney, of Ballsall Heath, near Birmingham—Improvements in certain kinds of spoons and ladles.
99. Arthur James, of Redditch—Improved means of inclosing needles.
286. Owen Williams, of Stratford, Essex—Improvements in water-closets.
1108. John Hetherington, of Manchester—Improvements in preparing cotton, wool, flax, silk, and other fibrous substances for spinning.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| June 6 | 3483 | Pencil-case. | James Hutton | 60, Burton-crescent. |
| „ 7 | 3484 | The Electric Gas-burner. | John Thomas Stroud | 140, Suffolk-street, Birmingham. |
| „ 9 | 3485 | Annular Fountain Reservoir for Liquid Compasses. | Frederick Dent | 61, Strand. |
| „ „ | 3486 | Fastenings for Window-shutters. | John Peakman | Birmingham. |

# SOCIETY OF ARTS.

### FRIDAY, JULY 22nd, 1853.

## MEETING OF COUNCIL.

### *Wednesday, July 20th*, 1853.

The Council this day further considered the subject of Lectures for Institutions, and having carefully weighed the results of the experience of the Institutes' Committee on this subject, together with the proceedings of the late Conference under this head, and the communications which had been received from the Institutions, and from Lecturers and others, it was

> "Resolved—That the Institutions do not appear at present to be generally in a position to afford to the Council the requisite facilities for bringing into immediate operation any extensive and complete scheme for systematically supplying the Institutions with Lecturers. That it be recommended to the Institutions to endeavour, with the aid of this Society, to form themselves, as far as possible, into local unions and sub-unions, with reference to Lectures. That when in any district a sufficient number of Institutions in Union with this Society shall be so grouped as to require among them on at least four successive nights in each of four successive weeks a lecture on the same subject, at a remuneration of not less than three and a half guineas each lecture, including all ordinary expenses, the Council will make arrangements to furnish competent Lecturers to such Institutions."

It is particularly requested that the Secretary may be kept fully informed, from time to time, of any steps which Institutions may take to form Lecture Unions. In the meantime he will be happy to afford such assistance as may be in his power with reference to the subjects of Lectures, the names of Lecturers, &c.

The following Institutions have been taken into Union since the last announcement:

281. Shaftesbury, Literary Institution.
282. West Hartlepool, Literary and Mechanics' Institution.
283. York, Institute of Popular Science and Literature.

## NOTICE TO INSTITUTIONS.

The Council have much gratification in announcing that, pending their negotiations with the publishers, they have received a communication from the Representative of the late Colonel Gurwood, offering to the Institutions in Union copies of the well-known "Despatches of the Duke of Wellington," published at eight guineas, in eight volumes, royal octavo, bound in cloth, for four guineas. The Council wish particularly to call attention to this favourable opportunity of obtaining on very liberal terms a work which, they presume to say, should be found in every public library. They will receive orders for the work, which should be accompanied by a Post-office order for four guineas, and will arrange for its prompt transmission.

## SALT—THE SOURCES FROM WHENCE IT IS OBTAINED, AND THE PROCESSES INVOLVED IN ITS MANUFACTURE.

### BY H. OWEN HUSKISSON.

Salt is one of the most abundant productions of nature, and is found in almost every country in the world. It is found in both kingdoms of nature, the organised and the inorganised. The geological position of rock salt is between the coal formation and the lias; and its thickness varies from one or two inches to twelve or fifteen yards. It is not deposited in regular strata, but rather in lenticular masses of variable extent. Salt springs occur in nearly the same circumstances as the rock salt, but the inland seas, salt lakes, and salt marshes, obviously have their several localities independent of geological formation. On an average, they yield four ounces of salt from a pound of brine. But the most magnificent mine of salt is the ocean, which contains about 2·5 per cent., or one fortieth of its weight.

Salt is prepared in various ways. Most of the salt consumed in this country is procured by evaporation of the water of brine springs. The salt districts are—Northwich, Nantwich, and Middlewich, in Cheshire; Droitwich, in Worcestershire; and Shirleywich, in Staffordshire. At Northwich there are mines as well as springs, the rock being for the most part of a reddish colour; but it is also met with in transparent colourless masses, which is the "sal gem" of old pharmacy. It is called in commerce "Prussian rock," and is largely used for exportation; it is obtained from the mines by blasting with gunpowder. In Poland, and some other places, rock salt is broken into fragments fit for the mills, where it is reduced into a coarse farina, and then serves all the uses of culinary salt.

When obtained from brine springs, the brine is pumped up from springs, which are from twenty to forty yards in depth, by water power, or, in case of failure from that source, by steam-engines, into large reservoirs near the "saltern" or "boiling house," dug out of the earth, and puddled on the inside with clay, where it remains exposed to the air until wanted. It is then drawn off into large oblong, wrought-iron evaporating pans, which are generally from twenty to thirty feet in length, and about the same in breadth, and nine or twelve inches deep; these pans are strongly set upon masonry, over a large furnace of four or more fires, so constructed that the heat plays under every part of the pan. The waste heat is afterwards sent, by means of the flue, to heat the rooms in which the salt is dried. The pans are protected from the weather by light pyramidal roofs of boards, sufficiently open to allow of the escape of the steam from the boiling brine. If the brine be not sufficiently saturated with salt, a little rock salt is sometimes added. When the brine attains the temperature of 100° Fahrenheit it grows turbid, and carbonate of lime and iron, which were previously held in solution by carbonic acid, are deposited. These are partly removed by a skimming dish, but much of the mass falls to the bottom, and cannot be removed until the first deposition of crystallized salt gives it a sufficient body to enable the workmen to rake it out. These two operations are called "clearing the pan." Some brines scarcely require them at all, and others only occasionally. There is also deposited a solid incrustation at the bottom of the pan (which adheres so strongly that it cannot be removed by raking) called "pan scratch," "pan scale," or "pan bake," and is forcibly taken away with a pickaxe every three or four weeks. After this is carefully done, the evaporation is continued at a boiling heat, when the salt gradually forms, and falls to the bottom of the pan in delicate white crystals, which are fished out as they collect with wooden vessels, and poured into large hollow wooden cones, having a hole at the apex. When the salt is sufficiently drained, the cones filled with it are taken to a large room, where they remain until thoroughly dry. That intended for home consumption is cast into pyramids or hoppers; that for exportation into cones, as this form is most easily broken, it being sent abroad in sacks. The grains or crystals of salt vary in size according to the degree of heat employed in their preparation; the greater the heat, the smaller the crystal.

In making the "stoved," "lump," or "basket salt" of commerce, the brine is brought to a boiling heat, which, in brine fully saturated, is 226° Fahrenheit. This temperature is continued during the whole of the process. At the end of ten or twelve hours the greater part of the water of solution is found to be evaporated, so much only being left as barely to cover the bottom of the pan. The salt is then removed into conical wicker baskets, termed "barrows;" and after being well drained, is dried in stoves, where it sustains a loss of about one-seventh part of its weight.

In the preparation of "common salt," the brine is first raised to a boiling heat, with the double purpose of bringing it as quickly as possible to the point of saturation, and of clearing it of its earthy contents; the fires are then slackened, and the evaporation carried on for twenty-four hours, with the brine heated to 160° or 170° Fahrenheit: after being drained it is carried to the storeroom, and not heated as the "stoved salt." In "large grained" or "flaky" salt, the brine is evaporated at 130° or 140° Fahrenheit, by which means it is harder, larger, and has more of the cubic shape of chloride of sodium. In "large grained" or "fishery" salt, the brine is evaporated at 100° or 110° Fahrenheit, and, by the slowness of the process, eight or ten days are necessary to complete a charge, the crystals of which are nearly cubical and perfect.

Where the salt is much mixed with the ingredients of the rock or soil, the process termed "lixiviation" is adopted. This consists in dissolving the salt with water, and so getting rid of the earthy impurities, when the brine is treated as usual. This method is followed in salty incrustations by the sides of seas or lakes, and upon some of the African plains, where the salt is not thick enough to be separated in flakes. Also in rocks which are imbued with salt, as that of the saline rock of Arbonne, in Savoy, which is a mass of saccharoid and anhydrous gypsum, saturated with common salt; after the salt is extracted, the gypsum is porous and light. The white sea salt of Normandy is prepared by gathering the muddy sand on the flats of the shore, which the rising tide has covered and impregnated with its waters for seven or eight days. The sand being removed into pits made for the purpose, discharges itself, by degrees, of all its water, which filtrates through straw with which the bottom of the pit is filled, and trickles into vessels set to receive it. Of this water they make their salt. This process is also adopted on the coast of China.

The extraction of chloride of sodium from sea water by fuel alone would be so costly as to exclude many maritime countries from preparing it. It has therefore led to many processes for obtaining it without artificial heat, or with the least amount that can effect the evaporation, advantage being taken of solar heat, surface evaporation, congelation, &c.

The process adopted in warm countries is solar or natural evaporation, under the form of "saline tanks," "brine reservoirs," or "salt marshes," called also "brine pits." The French salt marshes are large shallow basins or pans, excavated along the sea-shore; they are formed of clay, and the bottoms are very smooth. The water is admitted from the sea into a reservoir by means of a sluice; this reservoir is deeper than the proper brine pits, and is filled at high water, though the tides are rather inconvenient than otherwise. The sea is let into this reservoir in the month of March, where, while it is exposed, surface evaporation goes on to a great extent, and mechanical impurities subside. It then passes by a subterranean passage into a series of brine pits, properly so called, divided by means of little banks; channels of communication are pierced through these banks from one pit to another, so contrived that the brine has a very circuitous route, sometimes passing through three sets, and flowing 400 or 500 yards before it reaches the extremity. The various divisions have each a name, by which they are technically distinguished. During the whole of this time the brine has been undergoing evaporation; and when it arrives at the last division, it is so far concentrated that crystallization is soon effected. Sometimes the salt is allowed to subside in the first compartment, but the brine is generally supplied from the first reservoir as the water in the compartments evaporate. The salt is known to be on the point of crystallizing when the liquid assumes a reddish tint. Soon after this a pellicle forms on the surface, which breaks and falls to the bottom. It is then withdrawn from the pans, and collected upon the borders in conical or pyramidical heaps, called "camelles," where it drains and dries. The salt thus obtained is called "bay salt," and partakes of the colour of the bottom upon which it is formed, and is hence called white, red, or grey. The marshes should be exposed to the N.N.E. or N.W. winds. The operations begin in March and finish in September.

At Lymington, in Hampshire, salt is prepared from sea water by a combination of the natural and artificial systems. The salt water is admitted into a reservoir or pond, and from this successively into three series of brine pits or salt pans, where the water is partly evaporated by solar heat. When the liquid has acquired a sufficient density, it is conveyed into rectangular iron pans, where it is evaporated by artificial heat. Eight hours are required to boil each charge to dryness. The salt is then removed into wooden troughs or cisterns perforated with holes in the bottom, where it is allowed to drain, and is afterwards removed to the warehouse, where it dries. The drainings from the wooden troughs drop on upright stakes (old broom handles, &c.), where, in the course of ten or twelve days, it concretes in large stalactitic masses, each weighing sixty or eighty pounds called "salt cats." The residual liquor (bittern, bitter, or bittorn liquor) is received in underground pits, and during the winter season, when it is too cold for making salt, is used for the manufacture of Epsom salts (sulphate of magnesia). The salt cats bear the proportion to the common salt made from the same brine of 1 to 100. The specific gravity of the brine is ascertained by glass bulbs (on the principle of Lovi's beads) placed in a wicker basket, which is immersed in the liquid by means of a long handle.

Surface evaporation by graduating houses is extensively practised in France and Germany. The weak brine is pumped up into an immense cistern on the top of a tower, and is there allowed to fall down upon heaps of brushwood, thorns, &c., built up in regular walls between parallel wooden frames; by which it is agitated and divided by the air and evaporation promoted. At Salza, near Schonebeck, the graduation house is 5,817 feet long, the thorn walls are from 33 to 52 feet high in different parts, and present a total surface of 25,000 square feet. Under the thorns, a great brine cistern, made of strong wooden planks, is placed to receive the perpetual shower of water. Upon the ridge of the graduation house there is a long spout, perforated on each side with numerous holes, and furnished with stop-cocks or spigots, for distributing the brine either over the surface of the thorns or down through the mass—the latter method affording larger evaporation. The graduation house should be built lengthwise in the direction of the prevailing wind, with its ends open. An experience of many years at Salza and Durrenburg has shown that, in the former place, graduation can go on 258 days, and in the latter 207 days in the year, on an average; the best season being from May till August. At Durrenburg, 3,596,561 cubic feet of water are evaporated annually. According to the weakness of the brine it must be more frequently pumped up, and made to flow down on the thorns in different compartments of the building, called the first, second, and third graduation. A deposit of gypsum incrusts the twigs, which requires them to be renewed at the end of a certain time. The brine, which contains at first 7·962 per cent. of salt, indicates after the first shower, 11·473; after the second, 16·108; and after the third, 22. The brine, when concentrated to such a degree as to be fit for boiling, is kept in great reservoirs, of which the eight at Salza have a capacity of 2,421,720 cubic feet, and are furnished with pipes leading to the sheet iron salt-pans. The capacity of these salt-pans is various. At Shoenbeck there are twenty; the smallest having a capacity of 400 feet, the largest of 1,250 feet. They are inclosed within walls to prevent them being affected by the cold external air, and they are covered with a funnel-formed or pyramidal trunk of deals, ending in a square chimney to carry off the steam. In the construction of the salt-pans, the fire-grate is made to slope upwards to the back part, and is 31½ inches distant from the bottom of the pan. The ratio of the surface of the grate is as 1 to 59·5; that of the air-hole into the ash-pit as 1 to 306. The bed under the pan is laid with bricks, smoothly plastered over; and upon this, pillars are built in a radiated direction, six inches broad at the bottom, and tapering to an inch and a half at the top. The pan is so laid that its bottom has a fall towards the middle of two inches and a half. The fire diffuses itself in all directions under the pan, and proceeds through several holes into flues which run along three sides of the pan. The heated air is then passed under other pans, from which it is collected in chimnies, to be conducted to the drying-room. On the sides of the pans rows of boards are placed, slightly inclined, upon which the boiled salt is placed to drain. When it is drained sufficiently, it is put into small baskets, and carried to the store-room, which should be kept at a temperature of from 120° to 130° Fahrenheit. Upon both sides of the hot flues in the store-room hurdle-frames are placed, each of which contains eleven baskets; and every basket, except the undermost, holds 60 lbs. of salt, spread in a layer two inches thick. In proportion as the salt becomes concentrated by evaporation, brine is added from the settling reservoir of the graduation house, till finally small crystals appear on the surface, when the charge is worked off, care being taken to remove the scum as it appears. In some places the first pan is called a "schlot" pan, in which the concentration is carried only so far as to cause the deposition of the "sludge," from which the saline solution is run into another pan, and gently evaporated, to produce the precipitation of fine salt. In the "schlotting" or "throwing down" of the sediment, bullocks' blood, or eggs previously beaten up with some cold brine, are occasionally added to promote the clarification. When the brine acquires, by quick ebullition, the density of 1·200, it should be run off from the precipitating to the finishing or salting-pans. The boilers at Rosenheim, in Bavaria, evaporate 3½ lbs. of water for every lb. of wood consumed, which is considered a favourable result. The salt should be continually raked towards the cooler and more elevated sides of the pan, and then lifted out with colander shovels into large conical baskets, arranged in wooden frames round the borders of the pan, so that the drainings may flow back into the boiling brine. The graduation plan could not be carried on in this country without the aid of warm currents of air, artificially produced. In summer, saturated boiling brine is crystallized by passing it over vertical ropes; for which purpose 100,000 metres (110,000 yards) are mounted in an apartment 70 metres (77 yards) long. When the salt has formed a crust upon the ropes about 2½ inches thick, it is broken off, allowed to fall upon the clean floor, and then gathered up. The salting of a charge which would take five or six days in the pan is completed in this way in seventeen hours; but the mother waters are more abundant; this, however, is fully compensated by the salt being singularly pure.

In Sweden and some other cold countries, congelation is resorted to as a means of concentrating sea-water; for when a weak saline solution is exposed to great cold, it separates into two parts—one almost pure water, which freezes; and the other, which remains liquid, and contains the larger proportion of salt.

In those places where fuel is abundant, salt is extracted from sea water entirely by artificial heat. On the eastern and western coasts of Scotland, especially on the shores of the Firth of Forth, large quantities of salt are made by the evaporation of sea water. In consequence of the cheapness of fuel, the process is carried on, from first to last, at a temperature equal, or nearly so, to the boiling point; and varies therefore according to the concentration of the brine. The salt approximates in character to the "stoved." A salt is also prepared, called "Sunday salt,"—so named in consequence of the fires being slackened from Saturday to Monday, which much increases the size of the crystal. On the banks of the Mersey, near its junction with the Irish Channel, the water of that river, before evaporation, is brought to the state of saturated brine by the addition of rock salt. The benefit derived from this proceeding will be obvious, when it is stated that 100 tons of this brine yield at least 23 tons of common salt; whereas, from the same quantity of sea water, with an equal expenditure of fuel, only 2 tons 17 cwt. can be produced.

Chloride of sodium, as obtained from its natural solutions by evaporation and crystallization, or as rock salt, is always more or less mixed with saline, earthy, and other impurities; which render it necessary to be purified before it can be applied to economical or scientific purposes.

Of rock salt there are two varieties; the one, white and transparent, the other, of a reddish-brown. The former has been found to be almost pure chloride of sodium; the latter is contaminated with a marly earth, containing a small portion of carbonate of iron, to which it owes its colour, and sulphate of lime. These are partially removed by boiling and skimming; by boiling the brine you expel the carbonic acid, which holds the carbonate of lime in solution, and converts the carbonate of iron into an oxide; both of which are insoluble, and would be precipitated. Any earthy muriates can be precipitated by carbonate of soda, filtering and neutralizing the excess of soda, if any, with hydrochloric acid.

The waters of the ocean, from different parts of the globe, always contain the same ingredients. The variation in the relative quantities of the ingredients is, at the most, small, and arises from the nature of the beds of the ocean, from the dilution of the sea water by the flowing of rivers into it, by the rain, and through the ice masses of the Polar regions. According to Forcammer, the part of the ocean most rich in salts is the Mediterranean sea, in the vicinity of the island of Malta, which contains 37·177 thousandths of solid matter, in which 20·046 thousandths are chlorine. He also found the saline contents sensibly diminish towards the coast, even of the smallest islands. Dr. Ure states that the largest proportion of salt, held in solution in the open sea, is 38 parts in 1,000, and the smallest, 32. It contains the most saline matter in warm climates, and at the greatest depths. Mulder gives as the mean of a great number of analyses performed in his laboratory, the annexed:

| | |
|---|---|
| Chloride of Sodium | 78·5 |
| „ Magnesium | 9·4 |
| Sulphate of Magnesia | 6·4 |
| „ Lime | 4·4 |
| Chloride of Potassium | 1·0 |
| Bromide of Magnesium | 0·17 |
| Carbonate of Lime | 0·04 |
| Silicic Acid | 0·009 |
| Ammonia | 0·13 |

The great resemblance in the composition of various sea waters is shown by the specific gravity of the different kinds. Twenty-eight specimens, collected on a journey from Java to Holland, in different degrees of latitude and longitude, gave a density at 54° Fahrenheit for the highest of 1·02891, and for the lowest 1·02711. The average specific gravity ranges from 1·029 to 1·030. It freezes at about 28·5° Fahrenheit. The waters of the Mediterranean contain a little more lime than those of the Atlantic, but the quantity of magnesia is not augmented in a parallel manner. When the bottom of the sea consists of argillaceous clay, that is to say, when it consists of silicate of alumina and carbonate of lime, the water becomes richer in lime, and poorer in magnesia. One part of the carbonate of lime is replaced by the magnesia of the sulphate of that base, existing in the water, and forming a double silicate of magnesia and alumina. When the bottom is made up of broken shells, chalk, or quartzose sand, the quantity of magnesia in the water does not change. This circumstance contributes to reinstate in the waters of the ocean the carbonate of lime, which has been removed from it, by the shells of marine animals. The magnesian salts are very characteristic of sea water, and confer upon it many of its peculiarities; such, especially, as its bitter flavour and clamminess. Sea water is said, by Lewy, to contain only half as much gaseous matter as river water, and the quantity varies with the hours of the day. If taken up near the surface it contains the putrid remains of animal substances, which render it nauseous, and, in a long continued calm, even cause the waters to stink.

In the extraction of chloride of sodium from the waters of the ocean, the whole of the above valuable salts have, until very lately, been thrown away, their presence being considered rather detrimental than otherwise in the manufacture of salt from sea-water. In salt prepared by rapid evaporation of sea-water, the insoluble portion consists of a mixture of lime, with carbonate of magnesia, and a fine silicious sand; in the Cheshire brine it is almost entirely carbonate of lime: these being insoluble are easily removed. Chloride of sodium, from its tendency to crystallize in hot liquors which retain other salts in solution, can be easily taken out, as it forms, with a scoop, from those that remain, with the exception of chloride of magnesium, which adheres to, and between the interstices of, the crystals of common salt. This is the most troublesome thing to remove, and if kept in, renders the salt deliquescent, and when in large quantities, causes it to taste bitter. The Scotch variety, which is usually badly prepared, contains it to a large extent. Dr. Ure proposes to get rid of it by mixing quicklime in equivalent quantity to the magnesia present, which will precipitate this earth and form chloride of calcium, which will immediately re-act upon the sulphate of soda present, with the production of sulphate of lime and chloride of sodium. The former being sparingly soluble, is easily separated. Lime, moreover, directly decomposes the chloride of magnesium, but with the effect of merely substituting chloride of calcium in its stead: but in general there is abundance of sulphate of soda present to decompose the chloride of calcium, especially in brine springs. A still preferable method would be to add to it, in the settling tank, the quantity of lime equivalent to the magnesia, whereby an available deposit of this earth would be obtained, at the same time the brine would be sweetened. The solution, thus purified, may be safely crystallized by rapid evaporation. Muriates in salt may be removed by washing the crystals with a saturated solution of brine heated to ebullition, which is not capable of dissolving any more chloride of sodium, but will take up a considerable quantity of the earthy muriates.

The Edinburgh College gives the following directions for the preparation of pure chloride of sodium (*sodæ murias purum*): "Take any convenient quantity of muriate of soda; dissolve it in boiling water, and boil it down over the fire, skimming off the crystals which form; wash the crystals quickly."

In the beautiful and scientific method for the preparation of common salt from sea-water of M. Balard, and now followed by MM. Prat and Agard of Marseilles, purification is unnecessary. By this simple and elegant process, not only is perfectly pure salt prepared, but the other valuable salts existing in the ocean are also extracted.

It appears that the sea-water of the Mediterranean may be concentrated by spontaneous evaporation to density 1·27 without depositing anything but chloride of sodium. The mother liquor, or bittern, when further concentrated, first deposits, as its density rises from 1·27 to 1·32, a mixed salt, consisting of about 40 parts of sulphate of magnesia, and 60 parts of chloride of sodium; or, if the temperature falls to 6° Centigrade (43° Fahrenheit) or 7° Centigrade (45° Fahrenheit), bittern of density 1·32 deposits sulphate of magnesia nearly pure, in the proportion of about 90 kilogrammes of that salt from one cubic metre of fluid. It is proposed to use this salt to convert chloride of sodium into sulphate of soda, being the most economical use of it. The next important product is the double chloride of potassium and magnesium, which serves afterwards for preparing the chloride of potassium. This double salt is deposited from the bittern concentrated to density 1·345 by spontaneous evaporation, after the deposition of the magnesian salts; or by artificial heat in an evaporating pan. Dissolved in a small quantity of hot water, the double chloride undergoes decomposition, and allows the chloride of potassium to crystallize nearly pure on cooling. The last mother liquor above the density of 1·345, after the removal of the potash, contains much chloride of magnesium; a salt which may be had recourse to as a source of hydrochloric acid, being decomposed by distillation. The most valuable of these salts is the chloride of potassium, and M. Balard looks to sea-water as the great natural source of potash. The water of the Mediterranean contains, according to the analysis of M. Usiglio, 0·0505 pound of chloride of potassium in 100 pounds of water, or about $\frac{1}{2000}$ part of its weight of that salt.

The commercial salt of this country is for all dietetical and therapeutical purposes sufficiently pure; its low price being a guarantee against adulteration. Some years ago a vulgar and injurious prejudice prevailed that foreign salt was more powerful, and better for curing, or "striking" as it is technically called, fish and meat, than English salt. Dr. Henry, however, has proved to the Royal Society, in a paper read before them in 1809, that not only is English salt as powerful, but in some respects superior to the foreign salt. The following "Table" of the composition of various varieties, is taken from his paper:

ONE THOUSAND PARTS BY WEIGHT CONSIST OF—

| KINDS OF SALT. | Pure Muriate of Soda. | Muriate of Lime. | Muriate of Magnesia. | Total Earthy Muriates. | Sulphate of Lime. | Sulphate of Magnesia. | Total Sulphates. | Insoluble matter. | Total Impurity. |
|---|---|---|---|---|---|---|---|---|---|
| **Foreign Bay Salt:** | | | | | | | | | |
| St. Ube's | 960 | trace | 3 | 3 | 23½ | 4½ | 28 | 9 | 40 |
| St. Martin's | 959½ | do. | 3½ | 3½ | 19 | 6 | 25 | 12 | 40½ |
| Oleron | 964½ | do. | 2 | 2 | 19½ | 4½ | 24 | 10 | 36 |
| **British Salt from Sea Water:** | | | | | | | | | |
| Scotch (common) | 935½ | ... | 28 | 28 | 15 | 17½ | 32½ | 4 | 64½ |
| „ (Sunday) | 971 | ... | 11½ | 11½ | 12 | 4½ | 16½ | 1 | 29 |
| Lymington (common) | 937 | ... | 11 | 11 | 15 | 35 | 50 | 2 | 63 |
| „ (cat) | 988 | ... | 5 | 5 | 1 | 5 | 6 | 1 | 12 |
| **Cheshire Salt:** | | | | | | | | | |
| Crushed Rock | 983¼ | 0$\frac{1}{16}$ | 0$\frac{3}{16}$ | 0¼ | 6½ | ... | 6½ | 10 | 16¾ |
| Fishery | 986 | 0¼ | 0¾ | 1 | 11½ | ... | 11½ | 1 | 13½ |
| Common | 983½ | 0¼ | 0¾ | 1 | 14½ | ... | 14½ | 1 | 16½ |
| Stoved | 982½ | 0¼ | 0¾ | 1 | 15½ | ... | 15½ | 1 | 17½ |

Much of the salt sold in this country as "foreign bay salt" is only the large grained Cheshire salt. In France, where salt is of a greater value than in England, serious accidents have arisen in consequence of the use of sophisticated salt.

*(To be continued.)*

## INDUSTRIAL INSTRUCTION.

The Report of the Committee of the Council appointed on the 19th of January last, to inquire "how far and in what manner the Society of Arts may aid in the promotion of such an education of the people as shall lead to a more general and systematic cultivation of arts, manufactures, and commerce—the chartered objects of the Society," has just been published.* The Committee was composed of the Rev. Dr. Booth, F.R.S., Chairman and Reporter; Mr. Bell, Mr. Twining; and Mr. Peter Le Neve Foster, the present Secretary.

The first proceeding of the Committee was to endeavour to ascertain, with as much accuracy as possible, the sentiments of manufacturers themselves upon this question. For this purpose a circular letter was addressed to many of the leading manufacturers, from whom a decided expression of opinion was obtained as to the urgent necessity of an improved Industrial Instruction. A second circular was then addressed to those who had studied the subject of education as a great social question, as it was felt that if the results of the knowledge and experience of such men should be freely communicated, the value of the Report would be much enhanced. Circulars similar in purport to the preceding, but somewhat varied in form, were also addressed to the Directors of most of the large Mechanics' Institutions, to the Head Masters of the Endowed Grammar-schools, and to the principals of several proprietary and private schools. In these circulars there were eight distinct suggestions on which opinions were asked; and as the replies to these are taken separately in the Report, it will be convenient to follow the same order.

The first suggestion on the list was:

> "I. The improvement of the Endowed Grammar-schools, more especially of those which are not intimately connected with the Universities; to enlarge them, so as to introduce among the subjects taught the elements of Industrial Instruction."

The replies which have been received to this suggestion are very various; but it is stated, that "they all, without a single exception, evince, on the part of the writers, an earnest desire to improve, if they only knew how; to reform, if practical reforms were submitted. Some suggest that new rules be framed for the existing trustees; some, that the appointments to the head-masterships should be taken out of the hands of trustees, and vested in a Central Board;" or at least, that the local electors "should be restricted in their choice to certificated candidates;" but it is asserted by many that reform in the Universities "must, as a matter of necessity, precede reforms in the Grammar-schools." "Others, again, are convinced that the Government should issue a Commission of Inquiry to examine into, and to report as to the present state of the Grammar-schools in England and Wales, originally intended to benefit the poor. Many are indignant with the Court of Chancery; some complain of their visitors and trustees. Several desire to be supplied with well-qualified assistants," stating that persons able "to teach the elements of the natural sciences are not to be had;" and that if they could be found, higher salaries would be required than the present funds of these schools could meet.

The second suggestion on the list was:

> "II. The conversion of the present Mechanics' Institutions into Industrial Colleges."

Although this suggestion met with very general acceptance, it is considered that the evidence is by no means conclusive, and that it would be injudicious to interfere with them; because though imperfect as places of elementary instruction, they do still supply a want in our social system. Any change that might interfere with the perfect freedom of self-government they have always enjoyed, is deprecated; but it is thought "that aid, judiciously afforded, might enable many of them to supply that elementary instruction, of the grievous want of which they all so loudly complain."

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* "The Report of the Committee appointed by the Council of the Society of Arts to inquire into the subject of Industrial Instruction; with the Evidence on which the Report is founded. Published under the sanction of the Council of the Society of Arts." 5s. 8vo. Longman and Co. 1853.

On the third suggestion,

> "III. The introduction into proprietary schools and colleges of a system of instruction better suited to the wants of the middle classes,"

but little is said. The failure of these schools is attributed to the attempt to combine the old grammar-school system with a more modern one; and the effect has been, that the education of the middle classes is in a very unsatisfactory state, especially as compared with that of the classes immediately below them.

The next suggestion,

> "IV. Whether aid, in the first instance at least, should be afforded by supplying, at a reduced cost, maps and models, diagrams and apparatus,"

met with unanimous approval. It is conceived that the value of a Central Establishment for this purpose cannot be over-rated, and that by its means "every new improvement, wherever made, whether in the exposition of the principles of science, or in the manner of teaching and illustrating them, would soon be made known in the remotest districts of the country." This plan has been found necessary in the case of large public bodies dealing with elementary popular education, and would still, it is believed, be required, should "an improved instruction in the principles of natural and physical sciences be established." Some correspondents urged that it was not advisable to undertake to supply the apparatus of a system which was yet to be developed; and that it would be better to allow the system to grow up day by day, than force it into existence, by which neglect might arise, as had been the case with the numerous museums of the country.

On the fifth suggestion,

> "V. That systematic and defined courses of study be recommended;"

the expression of opinion was not very general, owing to its being practical rather than abstract. The preparation of good manuals and text books was, however, strongly recommended by several correspondents.

In regard to the next suggestion,

> "VI. That something in the nature of a system of prizes, exhibitions, or scholarships, be provided. Innumerable rewards exist at present for the cultivation of classical learning; why should there not be some for the promotion of industrial knowledge?"

much diversity of opinion was expressed. "While a great number of correspondents speak of it in the highest terms; others, on the contrary, whose opinions are entitled to grave consideration, make light of inducements of this nature; while some dwell on the principle that men should cultivate knowledge on higher grounds than the mere hope of honour or reward; others take the more practical view, that the hollowness of such rewards as medals and prizes, is quickly seen through, and that they very soon become objects of contempt." Scholarships, or other pecuniary aids, to enable students to cultivate to still higher perfection those talents with which they have shown they are endowed, are considered, however, to stand on a different principle; or else, "To what is the excessive study of the classics at the universities due, but to the exhibitions, the scholarships, the prizes, and the fellowships, which with certainty await and reward proficiency in them?"

The seventh and eighth suggestions,

> "VII. To hold public examinations at certain central localities, for the purpose of awarding such prizes."
>
> "VIII. To award to candidates who should distinguish themselves certificates of different degrees of merit. Such certificates, if carefully awarded, and after due examination might be made, as all analogy shows us, of great importance,"

met with the most cordial and unanimous approval from all persons. Indeed, it was said that any proposed plans of instruction, however excellent in theory, would fall into disuse but for examinations. Honorary prizes, as books or medals, being necessarily limited in number, must be conferred on relative, not on absolute merit, thereby fostering jealousies, and causing dissatisfaction; besides being at the same time transient in their influence. Now certificates of different grades, granted after careful inquiry and searching examination, seemed, to be free from all objections of this kind. They would also tend, it was conceived, to prolong the duration of school attendance, a point of vast importance, as the early removal from school was said to be one of the most hopeless features of the present day.

The views submitted to the Committee are thus summed up: "That a central Institution be established in London or Manchester, or in some other convenient locality. That, on the plan of the London University, it should admit into union with it, colleges, Mechanics' Institutions, schools, and even private seminaries; that the conditions of affiliation should be few and simple; that, like the London University, it should hold examinations; not, however, in London only, but throughout the provinces also. Unlike the London University, it should not only examine, but teach. It should be its especial duty to train masters as teachers of science, so far as it bears on industrial instruction; and not teachers only, but those also who intend to follow other occupations." * * * "The central Institution to have attached to it exhibitions or scholarships to reward those students who, at the local examinations, should distinguish themselves, to enable them to receive a higher kind of instruction."

The Report, in conclusion, refers to the Department of Science and Art, in connection with the Board of Trade, recently established by the Government, and says, that "much of the duty of the central body, to which reference has so frequently been made in the Report usually implying the Society of Arts, will now be assumed by the Government Department."

It may be stated, that the Committee received between 500 and 600 communications. Many of these are given in the Appendix to the Report, including letters from M. Arnoux, of the Potteries; C. Babbage, F.R.S.; M. Bontemps, of Birmingham; Sir David Brewster; Messrs. Broadhead and Atkin; Mr. Robert Chambers; Mr. W. Crum, F.R.S., of Glasgow; Mr. Ellis; Mr. Fairbairn, F.R.S., of Manchester; Mr. Felkin, of Nottingham; Mr. R. Fort; W. R. Grove, F.R.S.; Mr. Arthur Henfry, F.R.S.; Mr. Hick, of Bolton; Leonard Horner, F.R.S.; Professor Johnson, of Durham; the Rev. Dr. Kennedy, of Shrewsbury; Sir Robert Kano; Dr. R. G. Latham, F.R.S.; Professor Long; Mr. Mechi; Mr. J. Mercer, of Oakenshaw; Professor Miller, of Cambridge; Mr.

Herbert Minton, of the Potteries; Professor Moseley; Mr. R. Napier, of Glasgow; Mr. J. Nasmyth, of Manchester; Messrs. Nelson, Knowles, and Co., of Manchester; Mr. Osler, of Birmingham; Professor Phillips; Lieut.-Col. Portlock; the Rev. F. D. Zincke, &c., &c.; forming a most valuable body of evidence, such as is not to be found in any other place. It was intended that all the letters should be printed; but it was thought that the expense so incurred would cause the selling price of the book to be unduly raised.

## HOME CORRESPONDENCE.

### LECTURES.

Mechanics' Institution and Literary Society,
Leeds, July 9th, 1858.

SIR,—May I request a little space in your Journal to discuss some of the topics raised in the letter from Mr. J. H. Millard, of Huntingdon, which appeared in yesterday's number?

Your correspondent seems to think that in indicating a geographical division of the classes of lectures suitable for Institutions, he has given the Society of Arts a clue to the removal of all the difficulties that beset this subject. We, of the North, have, it is intimated, an ostrich craving for the hard realities of science, and really ought to be forced to take a little literature and *belles lettres*, to save us from "vulgar utilitarianism;" but the people of the South are supposed to have a liking for the "desultory dissertations despised at Oldham," with an especial desire for lectures typified by those of George Dawson and Mrs. Balfour.

If the speculation of our Huntingdon friend had any relation to or consonance with the facts, we might congratulate him as a great discoverer in the field of Institutional economics; but we must modestly forego the compliment paid to the scientific tendencies of the North, when we find that at the Manchester Institution while in fourteen years 902 lectures have been given, 452 of these, or 50 per cent., were on Literature, the Fine Arts, Drama, &c., and 450 on Science; and in a paper, I believe by the late Mr. Hogg, in "Chambers's Papers for the People," it is stated that of 1000 lectures delivered at forty-three Institutions, 660 were on literary subjects and music, and on science but 340, or only about 33 per cent.; and these data were chiefly, if not wholly, procured from the more Northern Institutions. Turning to our local returns for last year, it appears that at Bradford, out of 27 lectures, 18 were on various literary topics, and 9 on science, or only 33 per cent.; while the statistics of the Yorkshire Union for the year give the following summary: of 478 lectures given in 67 Institutions, 350 had literature and music for their subjects, and 128 were on science.

As I am not aware that any similar comparison has been made respecting the lectures given at Institutions in the South, I cannot show whether a larger proportion of literary lecturing characterises those societies; but I think I have established the fact, that we are not completely under the *iron rule* of science; that we take a good share of "sack" to our bread, and that our draughts of positive philosophy are "craftily qualified" with literature, *belles lettres*, and the other "humanities."

But that it would engross too much of your space, I could show, however, that this is not all matter of choice; a large number of the lectures referred to in all these statements are gratuitous, and it is so much easier to find men competent to take up literary than scientific subjects, that the former constitute the chief part of these unprofessional lectures.

I apprehend, Sir, that while we are thus seeking to get at a practical conclusion on this vexed matter by supposing a geographical distribution of taste, and possibly we may yet have an ethnological theory to supply any deficiency in that which takes locality for its basis, we may find all that is essential for us to know, with very little exercise of penetration. When, some years since, I asked a gentleman catering for a flourishing Institution in Lancashire, with reference to some lectures he was inquiring about, whether the members would tolerate a strong infusion of the mirth-moving element, his conclusive reply was, "Sir, human nature is the same in Lancashire as in Middlesex." I commend the philosophy of this sagacious dictum to all who seek to establish a distinction where there is no essential difference among bodies of people. I could easily show that it frequently happens —much too frequently—that in the midst of a manufacturing population, the bulk of the members of an Institution have no direct connection with actual manufactures; and moreover, that the more intellectual of the artizan class are very apt to devote themselves to literary studies, while the cultivation of science is pursued by those unconnected with mechanical or manufacturing operations: possibly this is it not as it should be, nor as it would be if these Institutions had made it a duty to give regular instruction in the elements of science to all the junior members; but it tends to prove that there is no necessary relation between a man's daily avocations and the mode in which he prefers to employ his leisure.

The real want of all Institutions—and by Institutions I mean the members constituting them—is, something which will gratify the senses, excite the imagination, and give an insight, however slight or transitory, into the mysteries of that world of knowledge, always in great measure beyond the ordinary ken of the mass of the people. If the scientific expositor possess the rare power of captivating the attention by the wonders of science, and satisfying the understanding with some coherent narrative of the great results, and explanation of the general laws of natural phenomena,—if he can illustrate the unknown and obscure by the familiar things and occurrences of daily life,—he will be listened to with eagerness, I had almost said with reverence: but he must be so consummate a master of the minds of an audience, that it may be considered they rather come to hear *him* than his subject. Now the rarity of finding men uniting these qualities, the exceedingly small number I should be enabled to name, were I disposed to be so invidious, among the men of science who have become popular advocates of science rather than its expounders, gives us little hope of seeing much successful scientific lecturing to the people. And although there may be a considerable utility in this sort of panoramic lecturing, it can scarcely be expected that men of standing will be ambitious to signalise themselves in these displays; hence there must always be a difficulty in supplying this kind of lectures; and certainly the more the members of any Institution devote themselves to regular study, the less they will prize such lectures. Now, as regards Literature, Art, and Music, it is much easier to find men competent to address mixed audiences with interest; the subjects are of a class which usually appeal to man's own nature and ordinary observation for evidence; hence, a man who shall be puzzled to comprehend the primary laws of the atmosphere, and be bewildered by the philosophy of levers, inclined planes, and the resolution of forces, may listen with attention, deep gratification, and perhaps moral and intellectual profit to a discourse on the poets; in the former case, to his untutored mind all the principles appealed to are to be gathered from without; in the latter, he has them all within.

The axiom, that "those who live to please, must please to live," applies with as much truth to Mechanics' Institutions, as to any other candidates for public countenance and support. With regard to the supply of the popular article, whether through the agency of the Society of Arts, or by the more direct encouragement of Institutions, it will always be limited by the very nature of the case, and again by the cost; and I cannot see any mode of surmounting these difficulties. The want is, I believe, a *temporary* * one, and it must be supplied as far as practicable by the resources available. If from the circumstances of an Institution, it cannot engage men from a distance to stir up the minds of the members, and this process is desirable, then let the best use be made of local talent; where this takes the direction of popularizing science, so much the better; but if it is of a kind to render it repulsive, eschew it altogether. If lectures cannot be given both calculated to interest and instruct an audience, and which so commend themselves to the public as to induce good attendances, then a committee may depend on it they have missed their way either in the selection or the mode of advertising such lectures.

So much depending on the MEN who lecture, I am satisfied that one of the best services the Society of Arts could render to Institutions would be the publication of a list of lecturers, and their addresses, with subjects, and the names appended to each of four or five Institutions at which he has appeared. If not giving all the information desired, it would at least supply much that is perpetually in request at all Institutions, and the want of which occasion endless correspondence and disappointment. Such a list should be as comprehensive as possible; there could then be no complaint of unfair selection, and the aspirant for distinction in this walk would not be excluded from all chance of success. Opportunities would also be afforded of ascertaining opinions of a lecturer from several sources.

As regards joint engagements the principal point appears to be, to get some means of putting Institutions in any given district in communication respecting their lecture wants. As it will usually be found that in a given area, say of 100 miles, there will rarely be more than twenty, or at most thirty Societies, which engage lecturers, these might select from such a list as I have mentioned the gentlemen they wish to engage, and send this to the Society of Arts, which might send a circular to the whole of such Institutes, including their collected proposals; and the ultimate correspondence could either be conducted by one of the local Secretaries, or the Society.

But whatever is done the most valuable service would be rendered by a List of names. There is no doubt much delicacy is required on the part of the Society of Arts in giving its recommendation to a lecturer; and it is questionable whether it would not feel somewhat scandalized by countenancing some lecturers in good esteem among many Institutions, but who carry popularity of style to the verge of charlatanry; while on the other hand, it is not difficult to suppose that the Society, naturally solicitous to promote the sound and useful, might lean to a class of lecturers whose high attainments may not be accompanied by a corresponding power of employing them agreeably. Altogether I believe the Society will be most useful in helping us to learn whose services are available, how we can ascertain their qualifications, and facilitating communications and arrangements in any mode most practical, leaving us entirely to our judgment in the selection.

The foregoing remarks apply exclusively to *popular* lectures, those intended to be listened to by the whole of the members, old and young, educated and uneducated, and of both sexes.

I am, Sir, your obedient Servant,
W. H. J. TRAICE.

To the Secretary of the Society of Arts.

## MUSIC LICENSES FOR INSTITUTIONS.

SIR,—I am very anxious to learn through the Journal, whether or not it is necessary for the Trustees of Literary Institutions to take out a Music License, for the purpose of having musical lectures, concerts, &c., in their hall, or lecture theatre. For the last three or four years we have done so, being threatened that unless we did, we should be informed against, and made to pay the penalties; but the license costs us yearly 4*l*. 14*s*. 6*d*., and this is too large a sum to spend, if not absolutely necessary.

I fear that as the law at present stands, we are clearly liable, and should be so according to *the letter* of the law, whether we let our rooms out publicly or not, if we took money, or consideration for money, (whether by ticket or otherwise) as the means of entry;—in this way those of our nobility who have concerts in their drawing-rooms, as we see occasionally done, and when admission is by ticket, for which money is paid, are also liable.

The expense of a license is not a fee paid to the Crown, for I believe none, or a very small one, is charged, but is incurred in the way the license is to be obtained. In our own case, for instance, we have to petition the Petty Sessions, to recommend us to the Quarter Sessions; this is required to be done in a particular way, and we must employ some solicitor to draw it up. This petition has to be backed by a recommendation from the inhabitants, and to obtain this, some one of us must go round the town and solicit signatures,—no very pleasant employment to go through every year. Having done all this, and obtained the approval of the magistrates at the Petty Sessions, it has to go to the Quarter Sessions, where on motion of counsel, who of course must be paid, the license is granted. Now this costs us 4*l*. 14*s*. 6*d*., all of which I believe is spent in fees and legal expenses; and after all it is only done to take care that concerts, &c., are not given in improper places, such as low public houses; and in order that so licensed, the police and magistrates may at any time enter and see that, under cover of a music license, nothing illegal is being transacted. I cannot help thinking that an Institution having once satisfied the authorities of the nature of its organisation, and having obtained permission to hold concerts, &c., in their rooms, should hold this in force without being subject to an annual renewal; in the same way as, in our case, one of our rooms is licensed for a place of religious worship, and this license once obtained, and obtained too at a cost of 2*s.* 6*d.* for entry fee, remains in force from year to year without renewal.

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* I say the want is *temporary*, because I am convinced that the popular skimming of a subject, which is alone practicable in a popular lecture, only tantalizes those who possess any amount of knowledge respecting it. The surgeon does not care to hear eloquent discourses on the first lines of physiology; the chemist who has once learned to weigh and measure, smiles at the chameleon pranks of the experimenter, quite as marvellous to the vulgar as the wizard's bottle, whence flow many-coloured drinks, and scarcely more instructive; and the tyro in natural philosophy is amazed to find a lecturer solemnly demonstrating the common properties of fluids. Only, therefore, while all wholesome instruction in the elements of general physics is so rare, can the popular demand for *talking about science*, rather than discourses upon it, exist. *Teaching* can be carried on in the class-room, and nowhere else.

Yours, &c.,
P. P.

## LOCKS.

SIR,—Mr. Hobbs having made no reply, through your Journal, to my letter of the 2nd instant, but having answered a challenge made to him since the publication of mine (by another person) in the *Times*, I must, I suppose, infer that the paragraph contained in that answer—in which he says, "It seems to be taken for granted that I am open to challenges like that of Mr. Cotterill, if only a sufficient inducement is held out in the shape of a pecuniary reward. I beg to assure that gentleman, *and others who have made the same mistake*, that they will hardly catch me 'tinkering' with my 'basket full of instruments,' either upon their demand, or that of any other man"—is to be the only answer Mr. Hobbs deems it advisable to make to my offer.

That I have no right to "*demand*" of Mr. Hobbs that he shall make the attempt to pick my lock I am willing to admit, as, in so far as I know, he has never ventured to insinuate that it is either insecure in principle or arrangement; but acknowledging this, as I readily do, Mr. Hobbs will still "find some difficulty in convincing either the Society of Arts or the Public" that even his ultra-republican sensitiveness at such demands being made upon him would operate so forcibly as to prevent his availing himself of the pecuniary reward I have offered him, unless this sensitiveness were accompanied in his mind with a very strong conviction that any attempt to avail himself of it must of necessity be futile.

The principles of my lock being entirely new, I may be allowed to say a few words respecting them.

The reason that combination locks can be picked is simply this—that access to the combination parts in them can always be obtained whilst they are in contact with the piece which prevents the bolt from being unshot, unless the combination parts are correctly arranged in position. The obvious remedy, is so to construct a lock that such access is impossible, and this I effect by completely closing up the key-hole during the whole time of such contact, making it impossible to unshoot the bolt whilst the key-hole remains open, or whilst the key or any other instrument remains in it. No skill is of any avail, consequently, towards acquiring a knowledge of the requisite positions for the combination slides; and to prevent its being picked by exhausting the chances, I have inserted a part which I designate the "detector bolt," which (should any prolonged attempt be made to pick the lock, and the person trying at length succeed in stumbling upon the positions for the slides, which must first pass the opposing plate) would at once be brought into action, and all further movement of the lock's mechanism entirely prevented; the key-hole remaining hermetically closed, no further attempts to pick the lock could be made. Of both the above principles I claim to be the original inventor and patentee; and I can only say, in conclusion, that my offer to Mr. Hobbs will remain open until the expiration of the time specified, that he may prove, if he can, any deficiency in them.

Respectfully yours,
WALTER H. TUCKER.

## SOCIETY OF ARTS' PREMIUMS.

SIR,—The discussion which is now being carried on respecting Mr. Saxby's lock will, I hope, lead to the opening up of the question, whether the Society's premiums are calculated to advance the cause of the industrial arts.

During the long period of the Society's existence, the sums expended by the Society in premiums have been very large; and it is to be hoped that the expenditure has rendered some assistance to the progress of the useful arts, and the applied sciences.

There is, however, an opinion among scientific men, and persons qualified to judge of the merits of inventions, that the Society has been too indiscriminate in the bestowal of its favours. Thus to quote only one example, Mr. Edward Troughton, in describing his *Dividing Engine*, in the "Edinburgh Cyclopædia," refers to a contrivance "by Mr. James Allen, an industrious workman, which he styles a self-connecting method of racking the plate, and which with the usual good-nature of the Society of Arts, was honoured with their gold medal." Mr. Troughton in the course of his description of the very difficult and delicate operation of racking the edge of the dividing plate of his engine, states why he considers Mr. Allen's invention to be of questionable value, and remarks, with more wit than reverence, that "in mechanical matters, faith is but a poor substitute for good works, and ought never to supersede the use of the senses."

It is not to be supposed for a moment that the eminent men who now compose the Council of the Society of Arts, would distribute the rewards of the Society by the easy exercise of good nature, instead of a correct judgment based upon a scientific and technical knowledge of the merits of the invention upon which they adjudicate. But I venture respectfully to express a doubt whether in so wide a range of subjects as is usually embraced by the Society's Premium-list, the Council, or the Committees appointed by the Council, can be in a condition to bestow their time, or to command that amount of technical information which shall convince the public that the Society has exchanged its character for benevolence for one of sagacity.

The question may now, I think, be fairly considered, whether the progress of the industrial arts does not admit of being promoted more effectually by other means than the bestowal of gold medals and money premiums,—such, for example, as the dissemination of sound information by means of *Lectures* and *Papers* by competent men; by the publication of a *Journal* of Industrial Art, of a far wider and more comprehensive character than the present one; by the formation of a large and well-selected *Library*, and a well-arranged industrial *Museum*; in short, by endeavouring to render the Society of Arts an exponent of the state of the useful arts and manufactures of the world, to which any one seeking information might turn as to an intellectual index, and find a prompt and satisfactory answer to his inquiry.

I venture to suggest, that the offer of premiums does not tend to develop talent. If sums of money be offered for the best Essays on particular subjects, those who are best qualified to write are not likely to compete on an uncertainty, for there is always a demand for the services of men of talent; while, on the other hand, those who have the leisure to write long Essays for prizes, seldom have much to say that has not been already better said.

With respect to inventions, the case is somewhat similar. My position is, that the offer of a small money-premium, or of a medal, does not stimulate invention, or set competent men to work to make discoveries *to order*. A man who has made a really good invention is not likely to bring it, in the first instance, to the Society of Arts; he would probably do one of three things: 1st, He would keep it to himself, and make a profit by it; 2nd, He would sell it to a manufacturer; or, 3rd, He would make it the subject of a patent. If it be a discovery involving the extension of the boundaries of knowledge, the discoverer would probably seek publicity in a more purely scientific Society than ours. In either case we are likely to be visited by a very inferior class of inventors and discoverers; and seldom, I do not say never, by men of genius.

Doubtless there have been occasions when the premiums of the Society have encouraged individual inventors,—men belonging to a past age, and to a different state of society,—men with little or no science, but who, by dint of untiring industry, and repeated failures, attained certain results of some value, but which are now attained by well-directed science, grafted on practical knowledge. The picture of a poor inventor working at his model, in the privacy of a solitary attic, denying himself and his family the necessaries of life, in order that he may keep before his eyes the mirage of a prosperous future,—such a picture now belongs rather to fiction than to actual life. An inventor now-a-days must be a highly educated man; that is, well versed in the science of his art, and with a profound knowledge of its practice. The introduction of the manufacturing system, and the enormous demand for automatic machinery, has raised up a class of highly educated and accomplished engineers, who have superseded the Arkwrights, the Hargreaves, the Comptons, &c., &c., and have reduced invention to the laws of inductive science.

For these and other reasons of a similar kind, I venture to recommend that the Society cease to offer premiums and rewards for inventions and discoveries. It may be objected that we thus relinquish one of the characteristics of the Society. It may not, however, be necessary to relinquish it, but only to modify it. The plan adopted by the British Association for the Advancement of Science, appears to be a practically good one. If the Society required an Essay or a Report on some branch of science, they invite a competent person to prepare it. If they desire to promote some experimental inquiry, they vote a sum of money to competent persons for conducting the experiments, and reporting thereon. I would ask the opinions of the members of the Council of the Society of Arts, and of the members at large, whether if the Society make grants of money at all, the great cause of industrial education would not be essentially promoted by engaging the services of intelligent manufacturers and others, to prepare Reports on the present state, the wants, and future progress of the various useful arts and manufactures, and to publish such Reports for the benefit of the members, and of the public generally? There are a vast number of questions connected with manufactures which require experimental investigation. Sums of money might be voted from time to time for conducting the experiments. The extension and improvement of the library and museum, the enlargement of the Society's Journal, the reading of papers, and the delivering of lectures, are points which I may probably again refer to in another letter.

I remain, Sir, your obedient Servant,
CHARLES TOMLINSON.

London, July 18, 1853.

## TIPPET'S COLD WATER STEAM ENGINE.

Parkstone, Poole.

SIR,—I have been much surprised to see so many notices of this invention inserted in the daily papers without an acknowledgment, or allusion to the original inventor, Mr. Jacob Perkins, an American by birth, but domiciled in England, who, about thirty years since, took out a patent for a cold water Steam-engine, with generators, as a substitute for the ordinary boilers.

Mr. Perkins's invention, being the subject of a patent, could not then come under the notice of the Society; but the members, as individuals, paid frequent visits to his manufactory, and derived much pleasure from witnessing the very great ingenuity displayed in the construction of so extraordinary a machine; for Mr. Perkins's aim was, to make an engine of the size of an ordinary two-horse power Steam-engine, which should do the work of one of twenty-horses power.

Mr. Perkins also produced a machine capable of proving the condensation of water under excessive pressure, and was the first to construct a steam-gun. He also attempted the impulsion of steam-boats, by means which may be considered as the original of the screw, in the shape of two fan-wheels on the same axis, but revolving in contrary directions, in order to obviate any tendency to drive the boat to port or starboard, the oblique vanes of his wheels being merely portions of a many-threaded screw. These facts are no doubt known to many still living, and I shall therefore decline entering into any controversy upon the subject.

Yours truly,
July 18th, 1853. HENRY W. REVELEY.

## PROCEEDINGS OF INSTITUTIONS.

FORDINGBRIDGE.—The exhibition, in connection with the Literary, Scientific, and Mechanics' Institution, opened on Monday week. Lord Shaftesbury was prevented attending, as was also the vicar, the Rev. C. Hatch. The Rev. J. T. Bartlett opened the proceedings with a short inaugural speech; after which the company dispersed throughout the hall and adjoining tents. Complete success has attended the whole undertaking; so much so, that the committee determined on keeping the exhibition open during the remainder of the week. A stall for the sale of fancy articles, for the benefit of our school established during the past winter, realised a considerable sum of money. Among the articles exhibited was a beautiful statue of Young Bacchus, from Sir Charles Hulse, who also lent many other articles of worth and rarity. A figure of Christ bearing the Cross, from Mr. Taylor, of Romsey; plate, from Mr. Pegler, of Southampton; and rugs, from Messrs. Blackmore's, of Wilton, were particularly admired. Of the tradesmen of the town, Mr. Waters and Messrs. Hutton sent drapery goods; Mr. Haydon, cases of stuffed animals; Messrs. Cusse, stationery and fancy articles; and Mr. Hillary, ironmongery in great variety Messrs. Thompson and Co. sent specimens of their sail-cloth manufacture, from its commencement in the green flax to its completion. The Rev. C. Hatch sent paintings, and specimens of antique china. Mr. Locke sent a circular table of his own manufacture; and Mr. J. Hannen various articles of interest. Mr. Keily, of Bournemouth, exhibited an Indian screen, and specimens of wool-work and tapestry. Dr. Mainwaring, of Bournemouth, sent a worked screen. Mr. Blake and Mr. Roe, of Salisbury, exhibited stationery; Miss Mullens, fancy wool-work; and Mr. Roe, an Austrian fountain playing eau de Cologne. Mr. Adams, of Ringwood, sent jewellery, watches, &c.; and Messrs. Chubb, of St. Paul's Churchyard, specimens of their locks, &c. Two large glazed cases contained Indian and other curiosities, mostly contributed by the neighbouring gentry. The Society of Arts contributed a large number of calotypes and photographic pictures, as well as good specimens illustrative of glass manufacture. Most of the families in the vicinity sent articles of beauty and rarity from their respective mansions, and the principal persons in the town appeared to have vied with each other in making the exhibition attractive and successful. Mr. J. Curtis's little wind instrument, a clavelina, and White's beehive in full work, must not be omitted.

## MISCELLANEA.

**Production of Gold by Artificial Means.**—M. Theodore Tiffereau, a Frenchman, says that he has discovered the means of making gold. In a paper laid before the Academy of Sciences, entitled, "The Metals are not simple, but Compound Bodies," he has put forth his views, and asserts that he has actually produced gold by artificial means. He proceeds upon a principle, admitted by all chemists, "that the properties of bodies are the result of their molecular constitution," and he adduces numerous examples in chemistry—in which bodies assume different properties according as they have crystallized in one form or another, although their composition remains the same. All that he had to seek was a substance which, by its catalytic forces would act upon the body which it was desired to transmute, and then to place this last under certain conditions in contact with it to effect the change. He believes that there are but very few simple substance, in nature, and considers that the forty metals now assumed to be such are in reality combinations probably of one radical with some unknown body hitherto not studied, but which of itself alone modifies the properties of this radical, and thus presents us apparently with forty bodies whilst in reality there is but one. If any one have discovered this body which has hitherto escaped the researches of philosophers, and can cause it to act on any given metal, is there anything surprising that he can change the nature of the metal by giving it with a different molecular constitution, the properties of that metal in which this constitution naturally exists? This he asserts he has done

**Operation of the Smoke-consuming Act in London.**—The Committee of the House of Lords on the Whitechapel Improvement Bill, the Earl of Derby in the chair, took some interesting evidence on the operation of the Smoke-consuming Act throughout London. Professor Brande, Superintendent of the Coining Department of the Mint, deposed that the furnaces there were supplied with the smoke-consuming apparatus, and that the volumes of smoke that formerly annoyed the neighbourhood were now done away with. Carbonic acid gas was evolved, however, in invisible smoke, but not to an extent deleterious or injurious to health. A material saving resulted from the lower priced coal burned. One or two of the breweries in the City of London, the smoke from which used to be a great nuisance, now consumed it entirely, and the saving effected in the fuel was calculated to pay the first cost of apparatus in the course of three years.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 14th July*, 1853.

649. Durham Election (Special Inquiry)—Report from Committee.
700. Trinity House Charities—Paper.
729. Post-Office—Return.
732. Post-Office Department (Packet Service)—Estimate.
746. Customs Duties (Isle of Man)—Treasury Minute.
629. Great London Drainage Bill—Minutes of Evidence.
695. Bills—Improvement of Towns (Ireland).
738. ,, —Thames Embankment (as amended by the Select Committee.)

*Delivered on 15th July.*

677. Arterial Drainage (Ireland)—Return.
715. Police—Second Report from Committee.
720. Parliamentary Papers—Report from Committee.
725. Bills—Dublin Carriage (Ireland).
749. ,, —Patronage Exchange.
750. ,, —Colonial Bishops' Act Extension.

British Fisheries—Report of Commissioners.

*Delivered on 16th and 18th July.*

683. River Fergus—Copies of Correspondence.
728. Fire Insurance—Account.
741. Government of India Bill—Further Correspondence.
745. Ramsgate Harbour—Copy of Sir J. Rennie's Reply.
753. General Committee of Elections—Mr. Speaker's Warrant.
754. Bills—Juvenile Offenders.
755. ,, —Land-Tax Redemption.
760. ,, —Succession Duty (as amended in Committee on re-commitment, and on consideration of Bill as amended.)
762. ,, —Highway Rates.
763. ,, —Turnpike Trusts Arrangements.
764. ,, —Turnpike Acts Continuance, &c.
765. ,, —Metropolitan Sewers Acts Continuance.
766. ,, —Sheep, &c., Contagious Diseases Prevention.
767. ,, —Public Works Acts Amendment (Ireland).
774. ,, —Consolidated Annuities (Ireland).
778. ,, —Universities (Scotland), amended.

Lunatic Asylums (Ireland)—Sixth General Report.
Criminal Offenders (Ireland)—Tables.

*Delivered on 19th July.*

675. Superintendent Constables—Abstract Return.
717. Piracy (Borneo)—Copy of Correspondence.
727. St. Luke, Chelsea—Copies of Correspondence.
737. Post-Office—Accounts.
225. Bills—Poor Relief Continuance.
719. ,, —Probate and Administration.
739. ,, —Copies of Specifications Repeal (amended).
776. ,, —Expenses of Elections (as amended in Committee on re-commitment, and on consideration of Bill as amended.)

*Delivered on 20th July.*

769. South Sea and other Annuities Commutation—Return.
771. Benefices—Return.
772. Chevalier Mustoxidi (Ionian Islands)—Papers.
773. Public Income and Expenditure—Account.
777. Militia Estimates—Report from Committee.
784. Bills—Burials (beyond the Metropolis).
785. ,, —Employment of Children in Factories.
786. ,, —Drainage of Lands (Ireland) Act Amendment.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 15th July*, 1853.

*Dated 30th March*, 1853.

761. L. M. Lombard—Motive power.

*Dated 18th June.*

1491. J. M. Hyde—Steam-engines, and production of steam.

*Dated 21st June.*

1519. J. Giret—Artificial and malleable stones, and apparatus for same.
1520. J. Leach—Looms for weaving.

*Dated 28th June.*

1559. C. Minasi—Concertinas.
1561. A. E. L. Bellford—Steam-boilers. (A communication.)
1563. J. H. Johnson—Turning over leaves of books, &c., and apparatus for same. (A communication.)

*Dated 29th June.*

1565. F. Steiner—Manufacture of wooden rollers.
1567. J. Patterson—Reaping and mowing machines.
1571. P. A. de St. Simon Sicard—Apparatus for raising sunken vessels, &c.
1573. S. W. Wright—Permanent way.

*Dated 30th June.*

1574. E. R. Handcock—Improvements in mechanism to decrease friction in propelling machinery, &c.
1575. A. E. L. Bellford—Construction of submarine tunnels. (A communication.)
1576. W. Rice—Harness, and in springs for same.
1577. J. Webb—Obtaining and applying motive power.
1578. G. Sterry—Producing designs in wood.
1579. A. P. How—Engine-meter for indicating number of strokes of an engine. (A communication.)

1580. E. Davies—Machinery for carding and cleaning cards.
1581. W. C. Spooner—Drills for agriculture.
1582. W. Tasker—Drills for agriculture.

*Dated 1st July.*

1583. R. Bradley and W. Craven—Moulding and compressing clay for bricks, tiles, &c.
1584. P. Hart—Manufacture of coke.
1586. G. Parsons—Machinery for thrashing, winnowing, and dressing corn.
1587. E. C. Shepard—Magneto-electric apparatus. (A communication.)

*Dated 2nd July.*

1588. J. and W. Rollinson—Preventing explosions.
1590. L. W. Wright—Machinery for pulverizing metalliferous quartz, &c.
1591. E. C. Shepard—Manufacture of gas.
1592. R. A. Brooman—Machinery for converting caoutchouc into circular blocks or cylinders, and manufacturing the same into sheets. (A communication.)
1593. R. A. Brooman—Impregnating threads, &c., with metal, called "metallic dyeing." (A communication.)

*Dated 4th July.*

1595. G. D. Fevre—Vessels for infusions, decoctions, &c.
1597. G. F. Parratt—Portable bridges.

*Dated 5th July.*

1598. H. Meyer—Looms for weaving.
1599. M. Davis—Improvements in carriages, scaffoldings, and ladders, which scaffoldings and ladders are used as carriages.
1600. D. J. Tripe—Locks.
1601. J. Fall—Treatment of oils.
1602. N. Pollard—Drawing wool and other staple.
1603. A. V. Newton—Machinery for printing. (A communication.)
1604. G. Mackay—Manufacture of glass. (A communication.)
1605. M. Poole—Quartz-crushing and amalgamating machine. (A communication.)
1606. G. A. Biddell—Apparatus for crushing grain, &c.

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## WEEKLY LIST OF PATENTS SEALED.

*Sealed 15th July, 1853.*

Year, 1853:

105. Edward Tasker, of South Hackney—Invention for the purposes of writing and drawing, called the "Writing and Drawing Tube."
107. James Hadden Young, of College-street, Camden Town—Improvements in brooms or brushing apparatus.
113. William Nairne, of South Inch Mill, Perth—Improvements in power-looms.
114. A. E. L. Bellford, of 16, Castle-street, Holborn—Improvements in the manufacture of "batting" or "wadding." (A communication.)
115. A. E. L. Bellford, of 16, Castle-street, Holborn—Improvements in the manufacture of blocks for printing music. (A communication.)
128. Robert Neale, of 49, Cumming-street, Pentonville—Improvements in the process of copper and other plate and cylinder printing and inking, and wiping and polishing by machinery the engraved plates and cylinders whilst used in the process.
136. Joseph Maudslay, of Lambeth—Improvements in steam-engines, which are also applicable, wholly or in part, to pumps and other motive machines.
225. William Archer, of Hampton Court—Invention of an improved mode or modes of preventing accidents by improved signals on railways, parts of which improvements are applicable to blast furnaces.
639. John Scott, Junior, of Greenock—Improvements in the treatment or manufacture of animal charcoal.
718. John Beaumont, of Dalton, near Huddersfield—Invention of a new manufacture of certain descriptions of woven fabrics.
734. John George Truscott Campbell, of 13, Lambeth-hill, Upper Thames-street—Improvements in ships' propellers.
738. John Scott, junior, and George William Jaffrey, of Greenock—Improvements in steam-engines.
983. William Johnson, of 47, Lincoln's-inn Fields—Improvements in machinery for combing wool, or other fibrous materials. (A communication.)
1102. Charles Larbaud, of Paris, Rue du Temple, No. 134, Département de la Seine—Invention of a new system of trigger applied to play-arms, such as pistols, fusils, rifles, cannons, guns.
1121. Christopher Nickels, of York-road, Lambeth—Improvements in machinery for masticating, kneading, or grinding India-rubber, gutta-percha, and other matters.
1154. Samuel Russell, of Sheffield—Improvements in handles for razors.
1195. Moses Poole, of Avenue-road, Regent's-park—Invention of a new or improved machine for pegging boots or shoes.
1199. John O'Keefe, of 12, Queen Anne-street, Liverpool—Improvements in the manufacture of watch-cases.
1204. Robert Walter Swinburne, of South Shields—Improvements in apparatus or machinery to be used in the manufacture of glass.
1216. Joseph Webb, of Mayfield-terrace, Dalston—Improvements in rotatory engines.
1232. William Gossage, of Widnes—Improvements in the manufacture of alkali from common salt.
1238. Thomas Grahame, of Hatton Hall, Wellingborough—Improvements in the manufacture of covering materials for houses and other structures and surfaces.
1253. Edward Hammond Bentall, of Heybridge, Essex—Improved machinery or apparatus for measuring and indicating the power exerted by engines, and also the force required to propel machinery, carriages, or ploughs.
1257. Joseph Betteley, of Liverpool—Improvements in anchors.
1260. Amédée Devy, of 73, Grosvenor-street—Improvements in storing and preserving grain. (A communication.)
1272. John Henry Johnson, of 47, Lincoln's-inn Fields—Invention of an improved forge-hammer. (A communication.)

*Sealed 16th July, 1853.*

110. Thomas Potts and James Septimus Cockings, of Birmingham—Improvements in the manufacture of tubes, and in the application of tubes to certain purposes.

*Sealed 18th July, 1853.*

124. Orlando Reeves, of the Castle, Taunton—Improvements in the manufacture of manure.

*Sealed 19th July, 1853.*

239. William Constable, of the Photographic Institution, Brighton—Improvements in transmitting motive power to machinery, and in regulating the action of rotary machines.
397. Joseph and Alfred Ridsdale, of the Minories—Improvements in ships' side-lights, scuttles, or ports
582. Nicholas Schmidt, of Goffontaine, near Sarrelouis, Prussia—Improvements in cleansing and separating ores and coal.
809. William Willcocks Sleigh, of London—Invention for the production of motive power, which he entitles the "Counteracting Reaction Motive-power Engine."
1140. Thomas Quaife, of Battle—Improvements in the manufacture of watches, watch cases, and in tools and apparatus employed therein.
1223. Charles Clarkson, of 9, Avery-row, Lower Grosvenor-street—Improved duster or dusting-brush, paint-brush, and all other description of brushes, the handle of which passes through the centre, and the hair or bristles are bound or tied round it.
1283. Samuel Sanderson Hall, of the Circus, Minories—Improvements in the means of preventing railway carriages running off the rails. (A communication.)
1285. William Edward Newton, of 66, Chancery-lane—Improvements in the generation of steam.
1287. William Haslett Mitchell, of Brooklyn, New York—Improvements in means for distributing and composing types.

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## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| June 13 | 3487 | Poultry Feeding Trough. | Barnard and Bishop | Norwich. |
| " 14 | 3488 | Improved Brace or Trousers-suspender. | Joseph James Welch and John Stewart Margetson | 17, Cheapside. |
| " 16 | 3489 | Rake. | Warren Sharman | Melton Mowbray. |
| " 18 | 3490 | Improved Hydrostatic Flushing Pan Closet. | George Robert Macnalley, the elder, Page Whitchurch, and George Robt. Macnalley, the younger | 63, Park-street, Camden Town. |
| " 19 | 3491 | Combined Case and Stand. | Thomas Cole | 6, Castle-street, Holborn. |

# SOCIETY OF ARTS.

## FRIDAY, JULY 29th, 1853.

## ADVERTISEMENT DUTY.

In the House of Commons on Thursday, in last week, the Chancellor of the Exchequer said that the Government had deferred to the opinion of what was undoubtedly a real majority of that House with regard to the advertisement duty. A bill would be introduced, and he hoped there was no reason why it should not become law at the conclusion of next (the present) week, or, at the latest, at the beginning of the following week.

It should be remembered that very shortly after the establishment of the Union of Institutes, the Council of the Society took into consideration the injurious effects of this tax, amongst others, upon the welfare of the Institutes, and the serious obstacle it presented to the promotion of the objects for which they were established, and they took steps for bringing the subject before the Legislature, with a view to its abolition. At the Conference held at the Society's house in June last, attended by 160 representatives from 270 Institutions in union, numbering 90,000 members, the subject was brought prominently forward and fully discussed. All united in showing the injury resulting from the tax, and a resolution condemnatory of it was unanimously passed by the meeting. The Council at once brought the proceedings of this Conference before the Chancellor of the Exchequer.

The Council must congratulate the Institutions upon the success which has attended their efforts, and they believe that the result has been very materially accelerated by the influence that this unanimous opinion of men so qualified to judge as the members of Institutions, could not fail to exert.

## THE PAPER DUTY.

### QUERIES PROPOSED BY THE SOCIETY OF ARTS, MAY 4TH, 1853.

### No. 3.—To Manufacturers from Paper, and Manufacturers using it.

The following are the replies which have been received to the third set of Queries on this subject. In Nos. 33 and 34, pp. 401 and 413, of the Journal, the answers which had been forwarded by different Paper Manufacturers and Wholesale Stationers were published.

1. Does the Duty press most heavily upon those qualities of Paper used for manufacturing and commercial purposes?

Mr. C. D. Collet says, "I doubt it, or the manufacturers and tradesmen would be more anxious for its repeal."

Mr. J. Chretien says, "Writing papers, drawing papers, and fine papers for printing, may be supposed to average 10*d*. per pound. Duty on the same, 1½*d*., and 5 per cent, or 1·575 pence per pound, equals 15$\frac{75}{100}$ per cent. Common papers, used for packing fancy boxes, book covers, say at 36*s*. per cwt. Duty on the same, 14*s*. 8$\frac{40}{100}$*d*., or 40 $\frac{83}{100}$ per cent. Showing that the duty on papers used in manufacture, and for packing manufactured articles, is nearly 260 per cent. heavier than on papers used for luxury and ornament; in addition to which, the low-priced articles are often manufactured from articles of home growth, and loaded with clay, whitening, &c., things costing little more than the expense of digging. I see that the *Weekly Times* newspaper is printed on paper made from straw, and when at Guildford a few days back, I was furnished with "charges for carriage" also on straw paper. Were the duty taken off, the consumption of it would be greater, and our mercantile marine would be increased by the extra vessels engaged in the guano trade."

Messrs. Dobbs, Kidd, and Co. say, "The duty presses most on brown papers, and, of course, the users thereof; it is our opinion that if the Excise duty was taken off brown papers, and foreign brown papers let in free, our brown paper makers would do quite well, as the carriage would be equivalent to a protective duty on such heavy material."

Messrs. Jeffrey, Allen, and Co., say, "As to paper-hangings, the duty presses unduly upon the consumers of the low-priced article, inasmuch as a piece (twelve yards) of paper-hangings sold for 6*d*., pays nearly 1*d*. duty; whilst a piece of elaborated work on satin paper, which may be sold for 12*s*., pays but 1½*d*. duty. The paper-hanging manufacturer feels the pressure of the tax, because much of the low-priced paper, intended for the poorer classes, is enormously consumed by parties who ought to buy a better article."

Messrs. J. and J. Leighton say, "Of the duty on paper, although it presses heavily upon the 'publisher's bookbinder,' who is exclusively engaged in binding or boarding vast numbers or editions; it does not so materially affect the extra bookbinder, whose work is costly, and is expended upon the literature of all nations and periods. The duty on paper and mill-boards is a small item on the binding that costs a guinea, whilst it is a large one upon the shilling volume. The duty upon the paper in 'Layard's Nineveh' is unimportant; whilst that upon the picture newspaper and penny publication is an extensive consideration. That the removal of the duty would aid the manufacture, and develope uses hitherto unheard of, we do not doubt; but, as extra bookbinders, we feel its retention by no means inconvenient."

Mr. W. Taylor says, "Unquestionably."

Messrs. H. N. Turner and Co. say, "It appears to us that the Excise duty paid on paper, does not materially affect the trade of paper-staining, except in the very lowest qualities; and in such paper-hangings, the foreigners do not compete with us. The chief inconvenience of the Excise duty on paper arises from the superintendence of the officers."

Mr. J. C. Wakefield says, "Yes."

Mr. C. Warwick says, "The duty presses very heavily on papers used for packing and business purposes: take, for example, brown and cartridge papers; the former worth a third, and the latter half the value of writing papers—but the duty being paid by weight is the same on all; and the common papers being treble the weight and not half the value, the injurious inequality is manifest."

Mr. C. Whittingham says, "Yes, generally, but in my own case the duty does not press heavily, as I use nearly all fine papers."

An Anonymous Correspondent says, "Yes, particularly on paper and boards which are used in the manufacture of boxes."

### 2. Does it affect injuriously many branches of trade into which these qualities enter as raw material? Please to specify any branches of trade so affected.

Mr. C. D. Collet says, "Tea, sugar, iron."

Mr. J. Chretien says, "It does; the fancy-box trade—a trade in which 4,000 persons are supposed to be employed in Paris only. The Excise regulations seriously interfere here, and paper is substituted by split timber—a very inferior article, and imported at a merely nominal rate of duty. In the article of boxes for sweetmeats packed in boxes, one gross of boxes, capable of containing three pounds of comfits, at 10*d.* per pound, or 2*s.* 6*d.*, cost 2*s.* Another description of box, capable of containing one pound of goods, value about 1*s.*, costs from 6*d.* to 1*s.* per dozen. It seriously affects business in the lower neighbourhoods, the cost of paper sometimes being weight for weight, four times the price of articles packed in it, for the lower class of manufactures, viz., alum, soda, ashes, plaster, and numerous other articles used in the Arts. In consequence of the duty, paper is again and again used for many purposes in succession, thereby diminishing the amount of labour in collection, carriage, and distribution; exclusive of which, and duty, goods of this class might be produced at about one-third of the present market price. At the present time, waste papers are selling at from 2*l.* 10*s.* to 7*l.* per ton, and even, in some instances, at 12*l.* per ton."

Messrs. Dobbs, Kidd, and Co. say, "We are not aware of any such."

Mr. W. Taylor says, "Every trade to which paper is an article of necessity, more especially pasteboard-makers, box-makers, printers, and booksellers."

Mr. J. C. Wakefield says, "Yes, particularly goods for export, for which all goods are separately put in papers; also the general business, where very large quantities are used in packing; also, hot-pressers and calenderers, whose consumption is large."

Mr. C. Warwick says, "The English manufacturer would adopt a variety of modes of setting off his goods, similar to the French, who have set us the example of using cartoons and fancy boxes for all rich dresses; and if the duty was removed, so that cardboard was reduced, a vast increase in its consumption would be the consequence. In order now to produce a box at a moderate price, thin wood is pasted over with a thin paper, but they become valueless immediately from their composition. It gives the French manufacturer a decided advantage, and they greatly excel us in the getting-up of their goods in this way.

Mr. C. Whittingham says, "It certainly must."

An Anonymous Correspondent says, "We think it lessens the consumption of rags."

### 3. Are there any trades completely closed by the operation of the tax, and, if so, what are they?

Mr. C. D. Collet says, "You will find this out when the abolition of the duty creates new branches of industry."

Mr. J. Chretien says, "Pasteboard-makers are nearly entirely shut out of the market as producers of board for railroad tickets and rough cards. By the Inland Revenue regulations, pasteboard-makers must only use new paper either for the middle or outside sheets; they must get their paper weighed, and pay duty on any connecting substance they use, or actually make false returns. But practically, in the article of railroad tickets and some other goods, the manufacturers work without entering or having their factories licensed by the Inland Revenue Board, thereby being able to use printed waste papers for middles, a greater quantity of loading matter, and to enable them legally to do it they must cut the edges, making cardboards, not pasteboard. The operation of the law is also injurious. I know one instance of an entry as a mill; it had been entered over a twelvemonth. The officers have a journey of between eight and nine miles, the distance as the crow flies being, by Ordnance map, seven miles. The revenue has received the amount of the license, but not one penny for duty. Had it not been for the duty a quantity of material lying there would long ere this have been in the market, thereby causing outlay for labour and carriage. There is also in the same district a large quantity of natural production, the removal of a portion of which for paper making would drain a large area, and render it suitable for agricultural purposes, thereby conferring a double benefit.

Messrs. Dobbs, Kidd, and Co., say, "We are not aware of any."

Mr. W. Taylor says, "Not that I am aware of."

Mr. Warwick says, "I know of no trade completely closed by the operation of the tax; but as the scaleboard is not adapted for ornamental purposes, and the duty on cardboard being so enormous on the cost of the material, it materially prejudices the artizan, and a trade that would employ thousands if our fruits were put up as the French; our biscuits and fancy confectionary would vie with theirs; and in passing any grocer's it may be seen how much more general this custom of putting in boxes small quantities is becoming, and the excellent and easy mode of sale by this means."

Mr. C. Whittingham says, "I do not know of any. Experiments are prevented by the trammels of the Excise regulations, and consequently improvements and discoveries are greatly hindered."

### 4. Are any others subjected to an unfair foreign competition?

Messrs. Carter, Vavasseur, and Rix, say, "We think that the competition between English and French figured silk manufacturers is carried on under circumstances more unfavourable to the former than need be, on account of the Excise duty levied on paper. To make a figured silk cards are indispensable, the quantity of them depending on the size and nature of the pattern designed. A figured silk which we made lately (we believe for Her Majesty) required 8,000 cards. Twenty cards, suitable for a 600 cord machine, weigh one pound, and can be purchased for about 7*d.* Of this 1½*d.*, or about twenty per cent., is duty paid. But as the makers and wholesale dealers require a profit on their capital paid into the Excise office, as well as on the cost of the material, we shall be more nearly correct in reckoning the increase of price by the duty as twenty-five per cent. Now for cards of the same description and quality (as we have taken, for example) the French manufacturer pays only about 2½*d.* French cards have been imported at different times, but without any profitable result to the importer, as the charges for the carriage of such a bulky article, together with the import duty, have raised their price almost to a level with English cards. 8,000 cards, then, in their raw state, before coming into the hands of the card cutter, will cost the English manufacturer 11*l.* 13*s.* 4*d.*, of which 2*l.* 6*s.* 8*d.* is duty paid; while the French manufacturer will obtain the same for 4*l.* 3*s.* 4*d.* It will be seen, on comparing the prices of English and French cards, that the Excise duty does not make all the difference, at any rate not directly; but we believe it does indirectly, for it would be difficult to show the cause why the English makers, if delivered from the burden of the duty and from the interference of the Excise office, should not make as good a card for 2½*d.* the lb. as the French maker. We look upon the duty, therefore, as operating to increase the price of cards much more than is indicated by the sum of 1½*d.* per lb. actually paid to the Excise. At present this part of the paper trade, being comparatively small and unimportant, is in the hands of a few makers, who get their own price. It is evident, therefore, that as respects cards, the English figured silk manufacturer works at a disadvantage compared with his rival. He is placed in this dilemma—he must either make a larger quantity than his opponent, in order to get back his money gone in cards; or, making the same quantity of a pattern as his opponent, he must ask a higher price for his goods. The low price of his cards enables the French manufacturer, by the same outlay of money, to obtain a greater variety of patterns than we can. It is this variety of design which constitutes his strength; he is able by this to meet all tastes, and there are almost as many shades of taste as there are wearers. Then the demand for a great variety of patterns calls forth the taste and stimulates the ingenuity of artists, who see a larger field open for their genius than we can show. As his outlay is smaller, a French manufacturer is repaid for it by making a smaller quantity of any one pattern than we can; he is thus able to turn round more quickly, to meet the changes of fashion; and is able, at less risk than ourselves, to stimulate demand by a never-ceasing, quickly-recurring novelty. Even were this obstacle to his progress (resulting from an unscientific financial system) removed, the English manufacturer of figured silk would have difficulties left sufficiently formidable to call for the energetic exercise of his utmost skill and care. The Lyons silk trade has been reared to its present perfection by the judicious attention of many generations; it has at its command an admirable organization, tending to one end—the progress of the staple in all its branches; it has an army of intelligent, well-trained operatives and ingenious machinists, with a staff of accomplished artists and chemists, and these in the midst of a people with natural good taste. The English have never yet brought to bear on this manufacture the science or taste which are the foundation of their rival's excellence. To do so now is the task before them, and they will have work enough to accomplish it, without being clogged with difficulties which their own Government have alone the power to remove. By remitting the paper duty, a most important concession would be made to the fancy branch of the silk trade, which would be enabled to compete on something like fair ground with its imposing rival. The chief objectors to the remission of the duty will be found among the wholesale paper dealers themselves, who look on the payment of the duty in the light of an investment of capital, and therefore feel no desire to have part of their capital unemployed, or seeking a fresh investment. They also consider that the larger the capital required for the trade, the less liable are they to an increase of competition by fresh persons engaging in it."

Mr. C. D. **Collet** says, "The book-trade with America; the Americans could not so easily print our books, if we could sell them cheaper."

Messrs. **Dobbs, Kidd**, and Co., say, "Not that we know of."

Mr. W. **Taylor** says, "None that I can think of, but box-makers; foreign boxes made of paper paying no duty (and otherwise cheaper than British), being admissible into this country at a duty of 10 per cent.; while similar ones made at home have paid 70 or 80 per cent. duty on the material to the Excise."

Messrs. H. N. **Turner** and Co. say, "We cannot answer for other manufacturers, where paper is largely consumed; but the English paper-maker is, in our opinion, in unfair competition with any foreign country that prohibits the exportation of their rags. In other words, free trade in rags is essential to free trade in paper."

Mr. J. C. **Wakefield** says, "Yes; shawl manufacturers, silk-weavers, and others, who use large quantities of cards for every pattern, which comes in direct competition with the foreign goods, where no duty is paid on boards."

Mr. C. **Warwick** says, "Fancy box-makers are subject to a most unfair competition; the article they use is subject to an Excise duty of 80 per cent. on its value; whilst the French, who are very large manufacturers in every variety, can send them to this market subject to 10 per cent. duty."

An **Anonymous Correspondent** says, "Boxes have been allowed to come in in a half manufactured state, thereby entering into competition with us."

## 5. Please to state any facts relative to the above, or any other points bearing on this inquiry.

Mr. C. D. **Collet** says, "Consider how much unexpected good has been obtained by unfettering the manufacture of glass, and from that you may form some idea of the effect likely to be produced by abolishing the duty on paper."

Mr. J. **Chretien** says, "The duty materially injures the agricultural population by nearly tripling the sale-price of paper. Were the duty taken off, a quantity of material used for litter might be judiciously applied, causing thereby an evener demand for labour in the agricultural districts. During the hay and harvest season, the supply hardly equals the demand; but from September to May, any one passing could see that labour is superabundant. In Flanders, it is a general practice to attach a workroom to the labourer's cottage. The duty and regulations likewise bar any material efforts towards improvement, preventing the introduction of papers into the market as specimens, as they could not be returned without a loss of nearly cent. per cent. They restrict trades, similar to those of papier maché, by barring the use of a material under a quarter of an inch in thickness. They shut out the employment of women and children in towns; as, could paper be bought, remade, and sold, without another duty, the quantity collected would be very great, thereby giving employment to those who had learned no art."

Messrs. **Heywood, Higginbottom, Smith**, and Co., say, "The duty presses most heavily on paper-stainers, some firms paying upwards of 10,000*l.* per annum in duty; if the duty was repealed, the trade would increase to a wonderful extent in the common or cheap paper-hangings. The duty as at present levied presses most unfairly on the working classes; as the duty on a paper worth 4*d.* per lb. is the same as on the finest quality, worth 7*d.* or 8*d.* per lb."

Mr. W. **Taylor** "would deprecate the removal of the duty, unless a drawback was allowed upon entire reams with labels showing duty to have been paid; and for this reason, that he, in common with many others, has to keep in stock numerous sizes, substances, colours, qualities, and kinds, amounting to several thousand reams, not having which, or nearly so, would ruin his trade and greatly inconvenience his customers; and having which, would involve a most serious loss."

Messrs. H. N. TURNER and Co. say, "Since it has been proposed to reduce the duty on foreign paper imported into this country, foreign paper-makers have called upon us, and asserted that if this proposition is carried into effect, they will be able to undersell the English makers."

Mr. J. C. WAKEFIELD says, "I firmly believe the consumption of paper would be nearly doubled were all restrictions removed."

Mr. C. WARWICK says, "The following is one of the glaring inconsistencies of our Excise on paper: A paper-maker may cut paper on his own premises, and these cuttings are again used for making paper, and no duty is taken on these paper-cuttings; but if the same paper is sent to an envelope-maker, or manufacturing stationer, no drawback is allowed on their cuttings, amounting in some cases from one ton to one ton and a half per week; these cuttings are sold again to paper-makers, who thus have to pay the duty on that which, if made in their own mills, would not be liable to duty at all."

Mr. C. WHITTINGHAM says, "Whatever the evil may be, arising from the amount of the duty, I believe that it is trifling compared with that arising from the obstacles and impediments created by the Excise regulations, and which are necessary to secure and collect the duty; and that the only way to obviate the greater evil is to repeal the duty."

An ANONYMOUS CORRESPONDENT says, "We think the total repeal of the tax would benefit trade generally."

## SALT—THE SOURCES FROM WHENCE IT IS OBTAINED, AND THE PROCESSES INVOLVED IN ITS MANUFACTURE.

[*Continued from page* 429.]

BY H. OWEN HUSKISSON.

A solution of salt, when pure, should not be precipitated by a solution of carbonate of ammonia, followed by a solution of phosphate of soda; thus proving the absence of any magnesian salt. A solution of 9 grains in distilled water is not entirely precipitated by a solution of 26 grains of nitrate of silver, and has the following properties:—It crystallizes in colourless, anhydrous cubes, or more rarely in regular octohedrons. The crystals are often grouped together into pyramids or steps, and in the salt pans are frequently so aggregated as to form hollow, four-sided pyramids, technically termed "hoppers." Obtained by slow or spontaneous evaporation, the crystals are solid cubes. It has generally a foliated structure, and a distinct cleavage; but it has also, sometimes, a fibrous structure. The massive salt has a vitreous lustre. The crystals are soluble in about 2½ parts of water at 60°, and its solubility is not sensibly increased by heat; it is nearly or quite insoluble in absolute alcohol. Its specific gravity varies from 2·0 to 2·5. The taste is what is usually known as salt, and is pure saline. When heated it decrepitates (owing to the expansion of a little interstitial water), more especially the coarse grained, or bay salt; at a red heat it fuses, and on cooling concretes into a transparent brittle mass; at a still higher temperature it volatilises, and tinges flame of a blue colour. Chloride of sodium, when free from all foreign matters, is permanent in moderately dry air, but ordinary salt is slightly deliquescent, owing to the presence of small quantities of chloride of magnesium. Rock salt is transcalent or diathermanous—that is, it transmits radiant heat much more readily than many other transparent bodies, as glass, Iceland spar, quartz, &c.

Its symbol is $\left\{ \begin{matrix} \text{Na.} & \text{Cl.} \\ \text{(Natrum)} & \text{(Chlorine)} \end{matrix} \right\}$; its equivalent weight, 58·5; and has the following composition:

| | Atoms. | Eq. Wt. | Per cent. |
|---|---|---|---|
| Sodium . . . . | 1 | 23 | 39·3 |
| Chlorine . . . . | 1 | 35·5 | 60·7 |
| | 1 | 58·5 | 100 |

The existence of soda in it was first shown by Duhamel. Glauber first obtained hydrochloric acid from it, and Davy first demonstrated its true constitution. It is known to be a sodium salt by its solution producing no precipitate with the phosphates, carbonates, ferrocyanides, and hydrosulphurets; also by the yellow tinge it communicates to the outer flame of the blowpipe, alcohol, and combustible matter. As a chloride, it is known by a solution of nitrate of silver throwing down a curdy white precipitate, which blackens by exposure to light, is soluble in ammonia, but insoluble in nitric acid. The presence of soda is often determined by purely negative evidence, all the salts being soluble. The only other substances likely to be confounded with it are the salts of potash, from which it is distinguished by its causing no precipitate with perchloric or tartaric acid, or with bichloride of platinum; also several of the salts of soda, which are efflorescent, while the corresponding ones of potash are deliquescent. It may also be added that chloride of sodium is devoid of odour and bleaching properties.

With regard to its physiological effects, salt in small quantities is injurious to very few, if any, plants, and to some it appears beneficial; used moderately, as a manure to certain soils, it is of great service. In large quantities it is injurious, though unequally so, to all plants. It is a necessary constituent of the drink of marine animals, and is also relished by most land animals. Lyell states that the bones discovered beneath the "Licks," in America, belong to wild animals that came in herds to taste the salt, and in their eagerness to obtain it pressed upon each other, and sunk in the soft parts of the bog. Dr. Fleming says that the eagerness with which quadrupeds and birds press towards salt springs and lakes indicates a constitutional fondness for salt. In the Ruminantia the salutary effects are especially observed. Morioud, in his work on "Veterinary Pharmacy," says that it contributes powerfully to prevent in these animals the bad effects caused by rainy seasons and wet pasturage, as well as damaged fodder. Given to animals intended for fattening, it gives more consistence to the fat, and more taste to the meat. In Brazil are salt licks, called "carreiros," which increases the value of the land very much. The herds of cattle, which often consist of 50,000 head, grow lean and are reduced to bad condition if they cannot get salt, which they lick with great eagerness, and which the proprietor has to find at a great expense if there is none on his land. To the lower animals it appears to be offensive and injurious; hence, rubbed upon meat, it prevents the attacks of insects, and when applied to the skin of leeches causes vomiting. Chloride of sodium serves some essential and important uses in the animal economy. It is employed by the people of all nations, from the most refined to the most barbarous, but the quantity taken varies with different individuals. It is an invariable constituent of healthy blood. Dr. Stevens, in his work on "The Blood," shows that in certain states of disease, as the cholera, there is a deficiency of saline matter, and in those cases it has a very dark appearance. It is doubtless of essential service in the bile, tears, and other secretions. Some of the properties of the sanguineous fluid, such as its fluidity, stimulating qualities, and power of self-preservation, are probably owing to its saline constituents. It is said that persons who take little or no salt with their food are very subject to intestinal worms, and Mr. Marshall, in the *Medical Journal*, tells us of a lady who had a natural aversion to salt; she was most dreadfully afflicted with worms during the whole of her life. Lord Somerville, in his Address to the Board of Agriculture, states that the ancient laws of Holland ordained that criminals should be kept on bread alone, "unmixed with salt," as the severest punishment that could be inflicted in their moist climate. The effect was horrible. These wretched beings are said to have been devoured by worms engendered in their own stomachs. In its local operation it is an irritant. Taken into the stomach in moderate quantities, it promotes the appetite, assists digestion and assimilation; if taken too freely occasions thirst, and long continued produces scurvy. In large quantities, as in the dose of a table-spoonful or more, it excites vomiting; and thrown into the larger intestines produces purging. In very large doses it acts as an irritant poison; a man swallowed a pound in a pint of ale, and died within twenty-four hours.

It is impossible to estimate duly the great value of this article, whether it is regarded scientifically, politically, or commercially. In some countries its value is so great that lumps of salt are used instead of money; in others, the mines and springs are worked by the government, and produce great part of the yearly revenue. It is of immense importance as a source of soda Soda has been used, from time immemorial, in the manufacture of soap and glass,—two chemical productions which employ and keep in circulation a vast amount of capital. The process of obtaining soda from chloride of sodium, is the one given by Leblanc in the last century, and still adopted, with a few minor improvements, to the present time. This grand process consists in converting the chloride of sodium into a sulphate of soda, by means of sulphuric acid, and decomposing the latter salt by means of coal and carbonate of lime, upon the floor of the reverberatory furnace. The duty upon salt checked for a time the full value of this discovery; when it was repealed, its price was reduced to its minimum, and the cost depended upon the sulphuric acid. This manufacture, says Liebig, may be regarded as the foundation of all our modern improvements in the domestic arts; and we may take it as affording an excellent illustration of the dependence of the various branches of human industry and commerce upon each other, and their relation to chemistry. This manufacture became of immense importance during the wars of Napoleon; France, before it was discovered, purchased soda from Spain, at an expenditure of twenty to thirty millions of francs annually. Marseilles possessed, for a time, the monopoly; the destruction of which, by Napoleon, excited the hostility of the people to his dynasty, who became favourable to the restoration of the Bourbons. France derives at the present time more than twenty millions of francs from this manufacture; other countries quite as much, or even more. The attempts to modify, or entirely supersede the process of Leblanc, have been incessant, and of the most varied character. One of the latest is that of Mr. Longmaid, for decomposing common salt by means of iron pyrites. It was ascertained that with a pyrites containing 2 or 3 per cent. of copper, sulphate of soda was economically produced by the ignition of the former with chloride of sodium,—the recovery of the copper. converted at the same time into sulphate of copper, contributing to the profit. A great benefit of this process is, that it dispenses with the preparation of sulphuric acid in the leaden chamber.

In the manufacture of soda from salt by Leblanc's process, it is first converted into sulphate of soda. The action of the sulphuric acid producing hydrochloric, or muriatic acid, to the extent of one and a half times the amount of the sulphuric acid employed. At first the profit upon the soda was so great that the muriatic acid was not collected; in fact, it had no commercial value. A profitable application of it was soon discovered: it is a compound of chlorine; and this substance may be obtained from it cheaper than any other source. Chlorine possesses powerful bleaching properties; but was not employed to its full extent until obtained from the residuary muriatic acid, from which it is prepared, by mixing it with peroxide of manganese and sulphuric acid, as a dense, suffocating yellow gas. As it was inconvenient to transport it to distances, either as liquid muriatic acid, or gaseous chlorine, it was combined with lime, forming a hypochlorite of that substance which is well known in commerce as chloride of lime, or bleaching powder. This compound possesses all the potent properties of chlorine, and is used for the purposes of disinfection, bleaching linen and cotton goods, rags for the manufacture of paper, &c. But for this process of bleaching, Great Britain could not have competed with France and Germany in the price of cotton goods. In the old process of bleaching, every piece must be exposed to air and light for several weeks during the summer season, and kept moist by manual labour. Now a single establishment near Glasgow bleaches 1,400 pieces of cotton daily throughout the year. The hire of so much land in England, necessary in the old operation, would require an enormous amount of capital, and would greatly increase the cost of bleaching, to pay the interest for the large sum expended. This would not be so much felt in Germany; but the cotton stuffs bleached with chlorine suffer less in the hands of skilful workmen; and in some parts of that country, they are adopting it, and find it advantageous.

It is used in many countries to raise a portion of the revenue. Rome was subject to a salt duty (*vectigal salinarum*). The *gabelle*, or code of salt laws in France, was most oppressive, and caused a vast amount of crime. In this country, a tax was first levied upon salt in the reign of William the Third. In 1798 it was *5s.* a bushel, which increased to *15s.*, or about thirty times the cost of producing it. It was repealed in 1823. Though this tax was regarded as impolitic, and checked the progress of manufactures and the arts, yet many clever political economists think a small duty might be levied on it without serious inconvenience. When the duty was at the highest, it produced about 1,500,000*l.* yearly. It is used in the arts as a coarse glaze for pottery; gives hardness to soap; improves the whiteness and clearness of glass. In dyeing, it is used as a mordant, and for improving certain colours; it preserves melting metals from oxidation, by defending their surface from the air; it is employed with advantage in some assays, and enters into many other important processes. To the chemist it is valuable as a source of soda and chlorine, and their compounds, from which he obtains the chloric acid, and combines with potash to form chlorate of potash, so largely used in the manufacture of lucifers. To the agriculturist it is useful as a manure and dressing to certain lands. It is used at the table as a flavouring or seasoning agent, being a necessary article of food, essential for the preservation of health and the maintenance of life. It is also largely used in the preservation and curing of alimentary substances. In medicine it is used as a vomit, purgative, to restore the saline constituents of the blood, alterative, astringent, dentifrice; as an external application to sprains and bruises; its tonic power proves useful in dyspepsia, and promotes digestion, and in correcting the weakened state of the intestines, which favours the propagation of worms. Dissolved in water, it forms a stimulating bath, and is a chemical antidote against poisoning by nitrate of silver.

Necker estimated the consumption of salt in those provinces of France which had purchased an exemption from the "*gabelle*" (*pays franc rédimés*) at about 19½ lbs. (English) annually for each individual; the people in this country consume about 22 lbs. On this supposition, and taking the population at 18,500,000, the entire consumption will amount to 407,000,000 lbs., or 181,696 tons. Exclusive of the home consumption, we annually export large quantities. The present price is about 14*s.* to 16*s.* per ton: in France, it is about 10 sous per kilogramme (2½ lbs. avoirdupois).

The remaining portion of Mr. Huskisson's paper treats of the geographical distribution of salt, and its produce and commerce in various places and countries. As this portion of the subject is treated of more in detail in Mr. Bollaert's paper, which was also rewarded by the Society, it is proposed to give the facts communicated by that gentleman in a future Number.

## PARLIAMENTARY PAPERS.

The Report from the Select Committee of the House of Commons appointed "to inquire into the expediency of Distributing Gratis, under certain Regulations, a Selection from the Reports and Returns printed by order of the House of Commons, amongst the Literary and Scientific Institutions and Mechanics' Institutes throughout the United Kingdom; and to inquire whether any alteration should be made in the mode in which such documents are sold, to make them more accessible to the community," has just been printed.

The Committee state that they have examined witnesses selected from the metropolis, from the manufacturing districts of Lancashire and Yorkshire, from the west of England, and from Ireland and Scotland; all of whom agreed that great advantage would accrue from a general diffusion of the most interesting and instructive Parliamentary Papers. This opinion was confirmed by the numerous petitions presented to the House, amounting to 272 in number, and bearing 15,284 signatures.

Mr. Baines, the President of the Yorkshire Union of Mechanics' Institutes, stated to the Committee that, in his opinion, the communication of Parliamentary Papers would elevate the character of the Institutions, check the spread of vulgar errors and prejudices, and stimulate thought and inquiry. The Rev. Dr. Booth thought, on public grounds, the country should know what was done in Parliament; that as Parliament had thrown open to the public what was said in Parliament, it ought also to give the means of access to know what was done in Parliament. Mr. Harry Chester, the Chairman of the Institutes' Committee of the Society of Arts, recommended the distribution of a selection of Parliamentary Papers "rather for the promotion of the public interest than for the benefit of the Institutions themselves." "I do not wish," he said, "to have them made privileged bodies; but I conceive that it would facilitate legislation, and promote the public interest, if Parliamentary Documents on important public subjects could be systematically distributed throughout the country, and it seems to me that these Institutions are bodies to which they might with the greatest advantage be sent." The same witness reported the great interest that was evinced by the public in the Reports of the Committee of Privy Council on Education. Copies of these Reports were now sent to all the Institutions in Union with the Society of Arts, and to the Yorkshire Union. As many as 10,000 copies of these documents had sometimes been given away. It appeared from the evidence of Professor Solly, that the Reports of the Board of Health, of the Department of Practical Art, and of the Government School of Mines, were also now distributed in a similar manner. From the evidence of Dr. Hudson it would appear that in the Institutions with which he had been connected no interest had been hitherto manifested in these Reports, but the Committee attribute this indifference to the defective manner in which they have been placed before the members. A miscellaneous mass, collected without care, and thrown together without arrangement, having been sent in many cases long after the interest of the subjects upon which they treated had passed away.

"The Committee were therefore of opinion, that an earnest desire to obtain Parliamentary Papers existed on the part of numbers of popular Literary Institutions, and that a judicious distribution of these papers, in accordance with well-considered regulations, might be advantageously sanctioned by the House. They recommended that the distribution should at first be conducted on a moderate scale, and that the supply should, if possible, be short of the demand.

"Great care, however, should be bestowed upon the selection. An indiscriminate mass of Reports would be of little or no value, and their bulk would soon cause them to be regarded as an incumbrance. The same selection, however, would not be adapted to all localities. Subjects interesting in an agricultural district, might be entirely neglected in one devoted to manufactures; and the Reports that would specially interest a maritime town might be little appreciated in an inland district. The Committee, therefore, considered it essential that, in any distribution of these documents, the particular wants of each locality should be considered, and that no Reports, except those of universal interest, should be sent to all Institutions.

"The Committee recommended, however, an exception to this rule with respect to Free Public Libraries:" to which they thought, "that, upon application from the managing body, the Parliamentary Papers should be sent free of all charge, immediately upon publication.

"The Committee had been confirmed in the opinion they had expressed of the advantage of diffusing such documents, by the practice in this respect of the United States' Government. The publication and distribution of Papers by the State Legislatures appeared to be conducted on a similar scale of liberality with that of Congress. The Legislature of New York has lately published for general distribution, an elaborate Natural History of that State; and it appears that similar proceedings are usual amongst the State Legislatures.

"The Committee further state, that from the evidence of Mr. Hansard, it appeared that the cost of 250 extra copies of two-thirds of the documents printed by Parliament (taking the Session of 1852 as a guide), would be only 1,000*l.*

The following are the recommendations made by the Committee:

1. "That a Select Committee of five members be appointed at the commencement of each Session, of which two shall form a quorum; and that to this Committee all applications for Parliamentary Papers from free

Libraries, Mechanics' Institutions, or other public Institions established for literary purposes be referred.

2. "That, on the receipt of any such application, the Committee shall direct an inquiry into the character of the Institution, the number of its members, the accommodation it can afford for Parliamentary documents, and enabling the public to consult them; and generally into any circumstances which, in the judgment of the Committee, may afford a guarantee that the books presented shall be carefully preserved, and rendered as accessible as possible to the public.

3. "That with this information before them the Committee report what Institutions are best entitled to receive the Parliamentary Papers, and select such Papers as they consider best adapted for distribution, regard being had to the particular interests of each locality, and that no more than one Institution in the same town or district unless under particular circumstances, be entitled to the privilege; that on such Report being agreed to by the House, the Printing Committee make arrangements as to the additional number of copies which may be required.

4. "That the Committee be empowered to forward the Reports and Papers selected for distribution, free of postage, to the several Institutions, and to impose such conditions as in each particular case they may think fit for their due preservation, and for facility of public access to them.

5. "That each volume so distributed bear a stamp, stating that it is to be preserved in the Institution.

6. "That an annual Report of the proceedings of the Committee be laid before the House."

## BEET-ROOT SUGAR.

The following valuable Table, showing the progress of the manufacture of sugar from beet-root in the Zollverein States in the years 1847—49, is extracted from the Journal of the Polytechnic Institute of Bavaria for March.

| | 1847—8. | | 1848—9. | | 1849—50. | |
|---|---|---|---|---|---|---|
| | No. of Factories. | Cwts. of Sugar. | No. of Factories. | Cwts. of Sugar. | No. of Factories. | Cwts. of Sugar. |
| 1. Prussia— | | | | | | |
| *a* East Prussia ... | 2 | 24,764 | 2 | 26,260 | 2 | 24,342 |
| *b* West Prussia ... | — | — | — | — | — | — |
| *c* Posen ............ | 8 | 177,011 | 8 | 118,116 | 8 | 135,126 |
| *d* Pommerania ... | 5 | 154,701 | 5 | 142,715 | 5 | 138,240 |
| *e* Silesia ............ | 24 | 960,857 | 29 | 1,038,849 | 29 | 1,581,246 |
| *f* Brandenburg .. | 3 | 119,993 | 4 | 168,338 | 3 | 123,098 |
| *g* Saxony ......... | 56 | 4,622,791 | 69 | 6,345,293 | 69 | 6,490,218 |
| *h* Duchy of Anhalt | 9 | 540,486 | 10 | 789,185 | 10 | 861,696 |
| *i* Westphalia ... | — | — | — | — | — | — |
| *k* Rhine provinces | — | — | — | — | — | — |
| Total in Prussia | 107 | 6,600,597 | 127 | 8,628,756 | 126 | 9,353,966 |
| 2. Baden ............ | 2 | 523,537 | 2 | 698,243 | 2 | 1,286,243 |
| 3. Wurtemberg .. | 2 | 270,382 | 2 | 207,570 | 2 | 357,551 |
| 4. Brunswick ... | 2 | 87,296 | 2 | 134,156 | 2 | 145,485 |
| 5. Thüringia ...... | 3 | 63,417 | 4 | 91,568 | 3 | 131,016 |
| 6. Bavaria .......... | 6 | 56,258 | 5 | 59,900 | 6 | 104,115 |
| 7. Saxony ......... | 2 | 30,766 | 2 | 27,694 | 2 | 52,925 |
| 8. Kur Hesse ... | 3 | 42,519 | 3 | 48,977 | 3 | 49,614 |
| 9. Gr. Du. Hesse | — | — | — | — | — | — |
| 10. Nassau......... | — | — | — | — | — | — |
| 11. Frankfort-on-the-Maine ...... | — | — | — | — | 1 | 36,638 |
| Total in Zollverein States ... | 127 | 7,676,772 | 147 | 9,896,864 | 147 | 11,517,553 |

## GERMAN PATENTS.

Table, showing the number of Patents granted in the Zollverein States during the last ten years, copied from the Journal of the Polytechnic Institute of Bavaria for May.

| | 1843 | 1844 | 1845 | 1846 | 1847 | 1848 | 1849 | 1850 | 1851 | 1852 |
|---|---|---|---|---|---|---|---|---|---|---|
| Prussia......... | 55 | 67 | 72 | 55 | 78 | 72 | 80 | 87 | 57 | ? |
| Bavaria......... | 77 | 125 | 124 | 112 | 155 | 97 | 97 | 115 | 97 | 77 |
| Wurtemberg.. | — | 25 | 22 | 18 | 12 | 8 | 8 | 16 | 26 | ? |
| Saxony ......... | 12 | 10 | 16 | 31 | 30 | 29 | 34 | 39 | 49 | 73 |
| Baden ......... | — | 5 | 4 | 9 | 5 | 6 | 8 | 2 | 8 | 9 |
| Duc. of Hesse | 14 | — | 5 | 9 | 11 | 7 | 3 | 6 | 1 | — |

## CULTIVATION OF FLAX IN INDIA.

The Secretary of the Agricultural and Horticultural Society of Bengal, writing on this subject, says: "The subject of flax cultivation in Bengal has not been lately before the Society; nor am I aware if any attempts have been recently made to prepare *fibre* from the plant, though its growth for the sake of *seed* has increased of late years, in proportion to the augmented demand. About twelve years ago the subject of this important staple was brought prominently to the notice of the Society by several members who were desirous of adding another useful fibrous material to those already exported from India. I remember it being then stated, that parcels (similar to musters exhibited to the Society, and which are still in its Museum), raised principally in the province of Bahar, were considered by London brokers as of *good* quality, and valued by them at a fair figure, comparatively with Belgian flax. But from the fact of the culture having been soon afterwards abandoned, it may be inferred that though the first experiments showed well, the cultivation did not pay when conducted on a more extensive scale: and this, I believe, arose from its having been undertaken in too expensive a manner; whereby the parties engaged were not only considerable losers, but others were deterred from entering on the speculation. Such, I recollect, having heard at the time; but I may have been misinformed.

"Whether if the cultivation were undertaken again on a less costly scale, and care and attention bestowed on the preparation of the fibre by practical men, it would prove sufficiently remunerative to induce a continuance of it, I am not prepared to say. I fear the climate of Bengal and Bahar, *in ordinary seasons*, is not so propitious to the growth of the flax plant as that of Belgium or Russia; for the same degree of heat which tends to produce such a superior oil-yielding seed, may cause a shorter, harsher, and more brittle fibre. Flax, as you may be aware, is with us a cold season crop, the seed being sour soon after the termination of the periodical rains, about the close of October, and the stalks gathered at the end of February, or the commencement of the warm weather.

"It may be, notwithstanding what has been stated above, that the culture of flax, and preparation of its fibre, would have received more attention at the hands of agriculturists in Bengal, if the demand for other fibrous materials had not increased so considerably during the last few years. One in particular I may refer to, 'Jute,' the produce of *corchorus olitorius*, which can be raised and prepared for the market at so low a figure when compared with flax, and the demand for which has increased so considerably, that it has naturally attracted much attention. But besides this, and 'Sunn,' (*crotalaria juncea*), we possess other fibrous materials which, from their excellent qualities, are likely at no distant day to prove useful substitutes for hemp and flax."

## DRAWING COPIES, MODELS, ETC., FOR INSTITUTIONS.

It is important for Mechanics' Institutes, and other Institutions of a similar character, to know that they are entitled to share in the privileges which the Government Department of Science and Art affords to National and other public schools, in obtaining drawing copies, models, casts, and materials, at a very reduced cost.

The great importance of elementary drawing to all classes of the community, in all relations of life, is now generally recognized; the first step to be taken to elevate public taste in the appreciation of correctness of form, is to cause drawing to become a part of national education. The Department of Science and Art is desirous of assisting as far as possible, in promoting the distribution of the means of accomplishing this object; but as the indiscriminate gift of examples to all applicants might lead to abuse, it is necessary to require some guarantee that the examples will be duly appreciated, which the mere request to have them does not imply.

The principle which governs the whole proceedings of the Department in all its branches, is to afford partial aid; and to encourage, but not supersede, public exertions, in promoting education in art. Thus the means of study in the Museum of Ornamental Manufactures are afforded—lectures are given, and students are enabled to obtain the best instruction in all the schools by payment of low fees in aid of the expenses; and it is considered that the same principle should be observed in the distribution of examples. It has therefore been resolved that the Department shall have the power to assist schools with samples of copies, models, and examples for teaching drawing, upon the condition that the applicants are willing to pay half the prime cost of them. By this means, when a school is willing to subscribe 1*l.*, the Department will furnish specimens of the value of 2*l.*, and so on, as far as the Parliamentary grant will permit.

A list of the specimens of drawing copies, models, casts, and materials, which the Department is prepared to furnish on these terms, may be obtained of the Secretary of the Department of Science and Art, Marlborough-house, London. It must be distinctly understood, that the privilege of purchasing these specimens can be obtained only by public and not private schools, and not by individuals.

## HOME CORRESPONDENCE.

### CALICO-PRINTING.

Hollingworth, Mottram in Longdendale,
July 12th, 1853.

Sir,—With reference to my invention for printing in ten or more colours in correct register, which was rewarded by the Society, and an account of which was printed in the Society's Journal of the 8th inst., I am desirous of correcting an erroneous opinion which some persons entertain that the gutta-percha pressure bowls will not bear the temperature of the printing-room, but will soon become soft and consequently useless. This mistake appears to have arisen from an idea that the printing-room is required to be of an elevated temperature, whereas such is not the case. The printing-room, if well arranged, will seldom exceed 60° Fahrenheit, and never requires any artificial heat. Any excess of temperature above the degree mentioned is a positive disadvantage, as the fibres of the cloth when dry will not absorb the mordant so readily. The drying stage, to which the textile fabric passes on leaving the printing-machine, is necessarily elevated to a high temperature, but is always kept distinct and separate from the printing-room, either in the story immediately above or in a room adjoining, a small aperture only being left for the transit of the piece; and as with my invention no revolving blankets are used, no return of heat from the drying stage can be communicated to the printing-room from that medium.

This explanation will, I trust, suffice to show that any apprehensions of the inefficiency of the pressure-bowls from the above-mentioned cause are quite groundless. I may further state, in practical illustration of my statement, that I have had seven printing-machines fitted up with the bowls in constant work for the last two years; and although the temperature of the printing-room has occasionally been elevated to near 100° Fahrenheit by the direct action of the sun's rays through the windows, the gutta-percha bowls have not exhibited the slightest tendency to become soft from such increased temperature.

The only precaution which it is necessary to take consists simply in properly attending to the lubrication of the journals of the copper cylinders, and thereby preventing the generation of friction at that point. This, if neglected, would raise the roller to a high temperature, which would act on the surface of the bowl in contact, and injure its smoothness and elasticity.

Attention to this precaution involves but little trouble on the part of the workman, and for this trouble we save in our own printworks 100*l.* per annum for each machine by the adoption of the principle of the gutta-percha bowls and the disuse of blankets and lappings. Besides this, we are enabled to produce finer and better work, and possess other advantages, enumerated in my former communication to your Society.

I am, Sir,
Your obedient Servant,
John Dalton.

## POPULAR LECTURERS.

Sir,—You will perhaps allow one who is intimately acquainted with the state of most of the Institutions in the south and west of England, to make a few brief remarks on a subject which has lately been much discussed in your Journal.

The difficulties in the way of a centralized arrangement for supplying the country with lecturers are probably more than any of your correspondents anticipate. Many of the Institutions in the north, and most of the Institutions in the south of England, have no lecture-room of their own, and can only obtain the use of rooms on certain evenings. In most cases a good audience can only be obtained on a certain evening or evenings in the week—these evenings being frequently the same in adjacent towns. These two circumstances will for ever render it necessary that the secretaries of the respective Institutions (and not any general secretary) should have the fixing of lecture evenings. With regard to the terms of lecturers, it is only necessary to appeal to the experience of many Institutions to show that price and quality do not always correspond. The high terms of London lecturers may be referred partly to the circumstance of these lecturers having a fixed residence or occupation in London, requiring their frequent passage to and from the City. A lecturer of economical habits, with no other occupation, who could devote his whole time to his profession, might supply provincial Institutions with lectures at nearly half the rate charged by London lecturers with equal profit to himself. Experience proves that London lecturers are not always the best expounders (admitting the eminence of some of them as men of science); and their terms, generally speaking, will never come within the reach of the great mass of Institutions. Most Institutions with which I am acquainted cannot, consistently with their permanent interests, afford more than from 1*l.* to 1*l.* 10*s.* per lecture. From twenty to thirty Institutions in Devonshire about two years ago were supplied by the Western Literary and Scientific Union with lectures at the rate of 1*l.* each. The lecturers were generally occupied five times a week, and their arrangements were such as to render their travelling expenses inconsiderable.

With regard to the Society of Arts recommending a number of lecturers to the choice of provincial Institutions, there can be no objection to the plan, provided care is taken to prevent any tendency to *monopolization*. The most impartial method would be one somewhat similar to that adopted by the College of Preceptors. The Society of Arts might appoint a number of gentlemen to hear a series of *trial lectures* by any who might choose to deliver them, and award certificates according to their merit; otherwise the Society of Arts would have a difficulty in ascertaining the *practical qualifications* of the number of lecturers whose services would be required. Meantime the safest course to be adopted by those societies who are ignorant of the merits of lecturers is to encourage no one who cannot produce evidence of his having lectured on *repeated occasions* to a number of respectable Institutions, with the Committees of some of which they ought to correspond previously to entering on an engagement.

ONE OF THE LECTURERS OF THE WESTERN
LITERARY AND SCIENTIFIC UNION.

Isle of Sheppy, 18th July, 1853.

## SOCIETY OF ARTS' PREMIUMS.

SIR,—I am glad to see that this affair of Mr. Saxby's lock has at last raised the question whether, as Mr. Tomlinson puts it, "the progress of the industrial arts may not be more effectually promoted by other means than the bestowal of medals and premiums."

I must say, I was surprised at the Society returning to this system last year, after it had been suspended for several years, and that interval occupied by the proceedings of the Great Exhibition. For I fancy there is no doubt of the truth of the following passage in *Fraser's Magazine* of last November: "What makes all this (the waste of time on the business of the Juries) the more provoking is, that it is no longer any secret that those who directed the affairs of the Exhibition saw quite as clearly, and quite as early, as other people that the prizes were a mistake, and ought never to have been instituted; but it was nevertheless determined to go through with the business, out of the notion that foreigners had only consented to exhibit their goods on the faith that these decorations should be a part of the Exhibition scheme."

If you could secure a sufficient number of competent and impartial judges, with nothing else to do but to sit at the Society of Arts, and examine the things sent in for premiums, it might be possible to avoid such gross blunders as that which has given rise to this discussion. But as these conditions are by no means likely to be fulfilled, it is hardly worth while to consider whether, even then, the attempt to encourage inventors by prizes would be successful. The truth is, that inventors want something else a great deal more than either prizes or encouragement: and that is, information as to what has been invented before, and either failed or succeeded. That kind of information is far from easy to obtain even for those who wish to obtain it, and have access to books; for this reason among others—that the writers of mechanical books do not think it worth while to fill their pages with descriptions of inventions which are known to have failed. But, besides that, it is unfortunately the case that inventors, especially those of small education, very often do not wish to ascertain, and even refuse to believe when they are told, that the thing they have invented has been invented, and found not to answer, long before. There was a good deal of evidence of this before the Patent Law Committee two years ago, and everybody who has seen much of inventors can verify it from his own experience.

Now, the Society of Arts has already in action a much better means of supplying inventors with what they really need than any prize machinery that can be devised; for it offers them the opportunity of having their inventions (if they appear to the Council to deserve it) explained and discussed at the weekly meetings of the Society, to which they specially invite those who are supposed to be conversant with the particular subject, whether members of the Society or not. No doubt these discussions might be improved, like most things in this world, and especially by limiting the paper or lecture on which the discussion is to take place to thirty or forty minutes, instead of letting it go on till the audience want to go home, and then beginning a discussion. They also have the advantage of bringing out opinions and information, without the evil of involving the Society in any decision; since we commit ourselves to nothing more decisive than the stereotyped and unmeaning vote of thanks, which, however unanimously it may be passed, is not usually admitted afterwards as conclusive evidence of the value of the "valuable services," on paper, for which it was awarded. Your obedient Servant,

E. B. DENISON.

## THE PAPER DUTY.

124, Fenchurch-street, and Colthrop Mills,
20th July, 1853.

SIR,—In replying to your queries last May respecting the Paper Duties, I was not aware that it was for publication. Upon reading the answers of your other correspondents to Query No. 4, it is quite evident that your Anonymous Correspondent knows nothing about the matter, or else wilfully states what is contrary to the fact, when he says that six hours is the utmost extent of detention by Excise. By referring to the Act you will see that it requires *forty-eight* hours' notice before you can charge, and twenty-four hours to remain for the chance of a survey, if further proof is required. Only last Thursday I sent an order down to my mill for some paper, which was tied up ready to send off, and by same post I wrote to the *Super*, requesting as a favour that he would charge it on Friday morning. The Act was imperative, and even the Super *could not* charge without *forty-eight* hours' notice; although it was very important, and I went down in the morning about it myself. Here is a fact easily proved. Your Anonymous Correspondent differs from me in every answer, and is about as correct in the others as in No. 4,—so much for the value of his information.

I remain, Sir,
Your obedient Servant,
EDMUND SHAW.

## PROCEEDINGS OF INSTITUTIONS.

**Allenheads.**—On July 23rd, a meeting was held in the Miners' Room for the purpose of establishing a Permanent Benefit Building Association for the mining districts of Allendale and Weardale, Mr. Sopwith in the chair; when arrangements were entered upon in conformity with views which the Chairman had fully explained at two previous meetings, one of which was occupied by a lecture on the subject. A knowledge of the correct principles of these and similar societies is of the greatest importance to the well-being of the industrious classes; and the principal members of the Libraries in these districts have made great exertions to secure the success of such Societies by having them placed on a solid basis under the revision of the most experienced actuaries. The excellent work of Mr. Scratchley on Building Societies was strongly recommended to the attention of the members present, and it was unanimously resolved to apply to that gentleman for his professional aid in the examination of the Rules and Tables.

**Sevenoaks.**—On Wednesday and Thursday, July 19th and 20th, Mrs. Balfour delivered two Lectures at the Literary and Scientific Institution, to overflowing audiences. That of Wednesday "On Cowper: his Life, Writings, and Genius." On this occasion the lecture was given in the morning, and the chair was taken by the Marquis of Camden. On Thursday the lecture was "Home Influence." The committee, class, and retiring-rooms connected with this Institution are now in course of erection.

## TO CORRESPONDENTS.

C. W. H., received. Will appear next week.

## MISCELLANEA.

**New Crystal Palace, Sydenham.**—The whole of the west end of the building it is expected will be finished by the end of this month, and the iron work for the east end, including the small transept roof, will be completed by the same time. The giving way of the staging for the central transept roof caused a trifling delay in that portion of the works. This accident was caused by the wind acting upon the staging whilst in an unfinished state. The tunnel is nearly finished, and the building of the Fine Art Courts is rapidly advancing. The foundations of the west wing are being proceeded with, and a large portion of the materials for both wings is on the ground. The towers are in active progress: the iron work will be ready to receive the tank next month. The apparatus for warming the building is progressing rapidly. The pumping engines are all constructed and in course of delivery. The pipes for the waterworks are being constantly delivered and laid to the various fountains. Those for the upper range are drawing towards completion. The well for supplying water to the reservoirs has been sunk and lined to the depth of 247 feet from the surface, and the artesian boring thence to the chalk is being proceeded with as rapidly as possible. The three large reservoirs are in a forward state, the chief part of their work being now completed. The difficulty of obtaining the large quantity of stone required has retarded the progress of the terrace gardens, but the contractors state, that they will be completed early in August. Extensive preparations have been made for the cascades and grand basins in the lower portion of the grounds, together with the geological illustrations, which are now in active progress.

**Decimal Coinage.**—The Committee have concluded the examination of witnesses, and it is understood the result will be a unanimous report in favour of the adoption of the decimal system of coinage and currency, making the pound sterling the integer, and dividing it into 1,000 units or farthings. Dr. Bowring—on whose motion in parliament the first step was taken in 1848, by the coinage of the florin, or one-tenth of a pound sterling—was the last witness examined, and gave most satisfactory evidence as to the extraordinary accuracy, rapidity, and facility with which all calculations are made and all accounts kept under a decimal system throughout the vast Chinese empire, with its four hundred millions of dependent subjects. He produced the instrument (abacus) by which arithmetic is taught in all the schools of China, and stated that a Chinese youth after a month's instruction is far more competent to apply all the rules of arithmetic to the business of life than a learner on our plans of instruction would be after the teaching of years. It was suggested in the Committee that the use in all our elementary schools of the abacus would greatly facilitate and popularise the introduction of a decimal system of currency and account.

**Discovery of Amber.**—Pieces of amber have for some time past been found on the coast of Courland, but in such small quantities that it was hardly considered worth while to collect them. In recently cutting a canal for draining a lake near that of Anserche, on the eastern coast of Courland, between 57 deg. 10 min., and 58 deg. 20 min. of north latitude, and not far from the Gulf of Riga, pieces of amber were found, and, on the search being continued, more pieces were picked up on the banks of the Lake of Anserche itself. At first the discovery was kept secret, as the lakes belong to the crown, and the amber was secretly sold for small sums by the persons who found it. But the inhabitants of the adjacent villages gradually became acquainted with the fact, and they made a practice of going *en masse* on Sundays to collect the amber. The priests, annoyed at seeing the churches abandoned, made inquiries as to the cause, and, on learning it, made it known to the authorities. The quantity of amber already sold by the peasants to Jew dealers, has brought them in not less than 4,000 silver roubles (the rouble is 4f. 5c.), but that is considerably less than its real value. The pieces of amber are for the most part transparent, and some of them are so large that they fetch from five to six roubles. In some of the pieces winged insects have been found.—*Daily News.*

**Library of the British Museum.**—A Parliamentary return shows that the estimated total number of volumes now in the library of the British Museum is 510,110. The number of volumes of each of three sets of the supplementary catalogue (exclusive of three sets of four volumes each, of indexes to long headings) is 305. Each set of 305 volumes contains 220,789 titles, calculated up to 24th June last. These titles are estimated to refer to about 135,000 volumes of printed books.

**New Source of Supply of Guano.**—Mr. James Caird states, in a letter to the *Times*, that an immense deposit of guano has been discovered in the Indian Ocean, between Mauritius and Calcutta. Four samples have been brought home, two of which are of superior quality, resembling the guano of Saldanha Bay. The other two are comparatively inferior; but as the samples were taken from near the surface, it is considered that they are inferior to what may be found beneath. The discoverer traversed the island in various directions, and found guano everywhere. The island is twenty miles long by seven broad, and is thus forty times the size of Ichaboe.

**Washing Clothes with Steam.**—The *New York Tribune* describes a machine for cleaning dirty linen by steam, by which the clothes are washed and dried ready for the wearer in less than thirty minutes. It consists of a strong wooden cylinder four feet diameter, and four and a half feet long, mounted on a frame, so as to be driven by a band on one end of the shaft. This shaft is hollow, with pipes so connected with it that hot or cold water, or steam, can be introduced at the option of the person in charge. The cylinder being half full of water, a door at one end is opened, and from 300 to 500 pieces of clothing are thrown in, with a suitable quantity of soap, and an alkaline fluid, which assists in dissolving the dirt and bleaching the fabric. When the cylinder is charged, it is put in motion by a small steam-engine, and made to revolve slowly, first one way a few revolutions, and then the other. During this operation the steam is let in through a double-mouthed pipe, somewhat in the form of the letter X, one mouth being in and the other out of the water; the steam entering the water at the immersed end, is passed through the clothes for fifteen or twenty minutes, and then escapes at the other. The steam is now cut off, the warm water drawn off, and then cold water introduced, which rinses the articles in a few more turns of the cylinder. The drying-machine seems, from the description, to be very similar to, if it be not identical with, the hydro-extractor or revolving-machine, by which water is driven out of goods by centrifugal force, invented some few years back by Mr. Seyrig, and manufactured by Messrs. Manlove and Alliott, of Nottingham. A cylinder of wire-network is made to revolve at a very rapid rate within a closed cylinder, by which all the moisture is carried to the outside case. It is said that with the washing machine one man and three women will wash from 3,000 to 5,000 pieces a day.

SUBSTITUTE FOR GUTTA PERCHA.—Dr. Riddell, officiating superintending surgeon of the Nizam's army, in making experiments on the Muddar plant of India (*asclopia gigantea*), had occasion to collect the milky juice, and found that as it gradually dried it became tough and hard, like gutta percha. He was induced to treat the juice in the same manner as that of the gutta percha tree, and the result has been the obtaining a substance precisely analogous to gutta percha. Sulphuric acid chars it; nitric acid converts it into a yellow resinous substance. Muriatic acid has but little effect upon it; acetic acid has no effect, nor has alcohol. Spirit of turpentine dissolves it into a viscid glue, which when taken between the finger and thumb, pressed together, and then separated, shows numberless minute and separated threads. The foregoing chemical tests correspond exactly with the established results of gutta percha. It becomes plastic in hot water, and has been moulded into cups and vessels. It will unite with the true gutta percha. The muddar also produces an excellent fibre, useful in the place of hemp and flax. An acre of cultivation of it would produce a large quantity of both fibre and juice. The poorest land suffices for its growth, and no doubt if well cultivated there would be a large yield of juice, and a finer fibre. A nearly similar substance is procurable from the juice of the *Euphorbia tirucalli*, only when it hardens after boiling it becomes brittle. The subject is most important; and if common hedge plants like the foregoing can yield a product so valuable, the demand for which is so certain quickly to outrun supply, a material addition will have been made to the productive resources of the country.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 21st July*, 1853.

698. Plymouth Election (Further Inquiry)—Report from Committee.
739. Passing Tolls—Copy of a Letter.

*Delivered on 22nd July.*

744. Exports, &c.—Account.
757. British Museum—Return.
770. Sir James Brooke—Copy of Instructions.
789. Bengal—Copy of Letter.

*Delivered on 23rd and 25th July.*

661. Berwick-upon-Tweed Election—Minutes of Evidence.
666. Court of Burgesses (Westminster)—Return.
752. Sheibar (Africa)—Copy of Despatches.
756. Customs (Donegal and Sligo)—Returns.
758. Poor Rates (Ireland)—Return.
782. Sheriff Courts (Scotland)—Return.
783. Edinburgh Annuity Tax—Returns.
541 (1). Metropolitan Commission of Sewers—Copy of Mr. Simpson's Report.
779. Trade Licences (Ireland)—Return.
781. Tralee Harbour and Canal—Returns.
802. Ministers' Money (Ireland)—Returns, &c.
705. Devon and Dorset Railway Bill—Minutes of Evidence.
786. Railway and Canal Bills—Fifth Report from Committee.
761. Bills—Betting-Houses.
790. „ —Juvenile Mendicancy, No. 2.
791. „ —Chancery Suitors' Further Relief.
798. „ —Truck Act Amendment.
799. „ —Friendly Societies.
801. „ —Crime and Outrage (Ireland.)
796. „ —Landlord and Tenant (Ireland), as amended by the Select Committee and in Committee.
797. „ —Stamp Duties (No. 2), as amended in Committee, and on re-commitment.
807. „ —Tenants' Improvements Compensation (Ireland), as amended by Select Committee, in Committee, and on re-commitment.
808. „ Metropolitan Building Act—Further Amendment.

Jamaica (Legislative Proceedings)—Papers

*Delivered on 26th July.*

674. Criminal and Destitute Children—Report from Committee.
703. Gold Coast—Copies of Despatches.
795. Public Income and Expenditure (Balance-Sheet)—Account.
805. Crime and Outrage (Ireland) Act—Returns.

Pentonville, Parkhurst, and Millbank Prisons, &c., &c.—Reports.

*Delivered on 27th July.*

668. Metropolitan Commission of Sewers—Copy of Reports.
775. Election Petition Recognizances—Report from Committee.
660. Taunton Election—Minutes of Evidence.
730. London, Liverpool, and North American Screw Steamship Company—Return.
285. Lunacy—Seventh Annual Report of Commissioners.
809. Bills—Transportation.
811. „ —Vaccination Extension (amended.)
813. „ —Duties on Horses let for Hire.
814. „ —Duties on Hackney Carriages.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 22nd July*, 1853.

*Dated 28th May*, 1853.

1322. C. H. Hill—Machinery for making hats, caps, and bonnets.

*Dated 4th June.*

1375. J. Chisholm—Artificial manures.

*Dated 10th June.*

1418. H. G. Symonds—Preserving meat.

*Dated 16th June.*

1468. P. A. le Comte de Fontainemoreau—Preparation of certain vegetable and alimentary substances. (A communication.)

*Dated 20th June.*

1510. R. Galloway—Refining sugar.

*Dated 4th July.*

1594. C. De Bergue—Manufacture of railway wheels.

*Dated 6th July.*

1607. T. Newey—Fastenings for wearing apparel.
1608. P. Erard—Steam-boilers.
1609. P. A. le Comte de Fontainemoreau—Printing-presses. (A communication.)
1610. J. Hood—Manufacture of ornamental fabrics.
1612. P. Gaskell—Elastic springs.
1613. T. W. Kennard—Iron bridges.
1614. J. Bradshaw and T. Dawson—Improved shuttle-skewer.
1615. R. A. Rüst—Pianofortes.
1616. J. Woodward—Apparatus for curling hair.
1617. W. E. Newton—Locks and latches. (A communication.)

*Dated 7th July.*

1618. H. Bate—Fire-escape, called the "Ignevador."
1619. J. Cheetham—Machinery for cutting velvets, &c. (A communication.)
1620. A. E. L. Bellford—Improvements in ships' logs. (A communication.)
1621. A. A. Croll—Gas apparatus.
1622. C. Vaux—Floating breakwater.
1623. J. K. Stuart—Hats.

*Dated 8th July.*

1624. B. Dangerfield and B. Dangerfield, jun.—Constructing and fixing railways.
1625. L. Cornides—Treatment of ores, &c.
1626. W. Marsden, jun.—Looms.
1627. W. Maddick—Treatment of madder.
1628. W. Robertson—Machinery for preparing, spinning, &c., cotton, wool, &c.
1629. J. Brett—Improvements in photography.
1630. L. Brunier—Power by compressed air.

1631. S. M. Saxby—Lowering ships' boats, &c.
1632. M. Poole—Printing-rollers.
1633. P. P. de St. Charles—Measuring distances travelled by cabs, &c.

*Dated 9th July.*

1635. T. Restell—Walking-stick umbrellas.
1636. E. Riepe—Turret-bells. (A communication.)
1637. E. Riepe—Moulds for steel-castings. (A communication.)
1638. H. H. Peppin—Improved joint for umbrella-sticks. (A communication.
1639. J. T. Boulé and F. Cailland—Composing and distributing type.
1640. F. Meyer—Candles and night-lights.
1641. P. A. Tourniere and L. N. de Meckenheim—Soap and washing-paste, &c.
1642. M. Sprot, jun., and R. Denholm—Pipes from plastic materials.
1643. G. P. Renshaw—Cutting and shaping.
1644. W. Skinner, jun.—Windows, shutters, &c.

*Dated 11th July.*

1646. P. Fairbairn—Machinery for heckling flax, &c.
1648. F. Wrede—Gas and air-engines.
1650. G. Dalton—Reverberatory and other furnaces.

*Dated 12th July.*

1652. J. B. Finnemore—Sofa-springs, &c.
1654. P. Cowan—Gas-fittings.
1656. A. Burns—Constructing iron ships, &c.
1658. J. Fletcher—Machinery for spinning, &c.
1660. N. Ardasseer—Driving shafting.

*Dated 14th July.*

1670. Hon. Sir R. Brown—Improvements in coffins, &c.
1674. A. L. J. Lechevalier St. André—Packing goods.

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APPLICATIONS WITH COMPLETE SPECIFICATIONS FILED.

1662. A. W. Craig, D. Foster, and T. Valentine—Preparing wet spun yarns. 13th July, 1853.
1684. P. O'Malley—A new liquid beverage. 15th July, 1853.
1711. D. Brims—Safety apparatus for preservation of life on water. 19th July, 1853.

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## WEEKLY LIST OF PATENTS SEALED.

*Sealed 20th July*, 1853.

140. Cornelius Ward, of 36, Great Titchfield-street—Invention of a new construction of the musical instrument designated the Bassoon.
141. Cornelius Ward, of 36, Great Titchfield-street—Invention for combining the musical instruments designated the Drum and the Cymbals, in such manner as to make them one instrument, which instrument he terms the "Cymbal-Drum."
148. George Carter, of Mottingham Lodge, Eltham, Kent—Improvements in the construction of furnaces.

*Sealed 22nd July.*

170. Arthur Wellington Callen, of Peckham, and Abraham Ripley, of Westminster-road—Improvements in the mode of giving and transmitting multiplying rotative motion to shafts and other revolving bodies.
178. William Kendall, of Blawith, near Ulverstone—Improvements in the manufacture of boxes and similar articles, and in the machinery or apparatus to be employed therein.
210. Robert Shaw, of Portlaw, Waterford—Invention for starting, stopping, and reversing steam-engines.
258. Frederick Lawrence, of the City Iron-works, Pitfield-street, William Davison, of Halstead, Essex, and Alfred Lawrence, of the City Iron-works, Pitfield-street—Improvements in engines to be worked by steam or other fluid.
374. George Henry Bursill, of Oxford-road, Barnsbury-park—Improvements in operating upon auriferous quartz, clays, and other minerals, preparatory to, and in order to accomplish the separation of the gold and other metals; also in machinery or apparatus for effecting such improvements.
394. Adolphe Nicole, of 80, Dean-street, Soho-square—Improvements in rotary engines.
712. Charles William Siemens, of the Adelphi-terrace, and Joseph Adamson, of Leeds—Improvements in rotatory fluid meters.
910. William Ogden, of Oldham—Improvements applicable to carding-engines used for carding cotton, wool, and other fibrous materials.
1103. John Rawe, jun., of Lemaile, near Wadebridge—Invention for propelling vessels and other vehicles in the water.
1212. George Jones, of Birmingham—Improvements in ventilating mines.
1248. Edward Jones Schollick, of Aldingham Hall, Ulverstone—Improvements in obtaining motive power.
1266. William Simson, of Edinburgh—Improvements in locks.
1286. Jonathan Dodgson Carr and John Carr, of Carlisle—Invention of an improved construction of oven.
1294. William Warcup, of Lyndhurst Villa, Coronation-road, Bristol—Improvements in the construction of springs for carriages and other similar purposes.
1298. William James Harvey, of 68, South-street, Exeter—Improvements in fire-arms.
1303. William Henham, of East Peckham—Improvements in ploughs.
1318. Daniel Bateman, of Low Moor, near Bradford, Yorkshire—Improvements in carding wool and other fibrous substances, and in the manufacture of cards for that purpose.

*Sealed 23rd July.*

175. Donald Beatson, of Mile-end—Improvements in the means of propelling ships and other floating vessels.
176. William Nairne, of South Inch Mill, Perth—Improvements in dressing yarns for looms.
185. William Thomas Henley, of St. John-street Road—Improvements in covering, laying, and uniting wires and ropes for telegraphic purposes, and in the machinery employed therein.

*Sealed 26th July.*

197. Nicolas Francisque Ador, of 16, Castle-street, Holborn—Improvements in preparing plastic materials, to be used in the manufacture of fired wares, and for other purposes.
229. Francis Whishaw, of 9, John-street, Adelphi—Invention of an improved lock or system of locks.
233. Marcus Spring, of 25, Church-row, Hampstead—Improvements in apparatus for separating gold from matter mixed or combined therewith. (A communication
256. David Chalmers, of Manchester—Improvements in looms.
347. Isaiah James Machin, of Leigh-street—Improvements in nut-crackers.
361. Charles Breese, of Birmingham—Improvements in ornamenting papier maché, japanned, iron, china, and other hard or bright surfaces, with gold.
531. Charles Hennpage, of King's Norton, Worcester—Invention for the application of certain materials to the manufacture of coffin furniture.
841. Leopold Joseph Green, of Leatherhead, Surrey—Improvements in axletree boxes.
941. Lambert Adolphe Beauvain, of 30, Upper Charlotte-street, Fitzroy-square—Improvements in machinery for obtaining wool, silk, and fibres from fabrics, and rendering them suitable to be again employed.
1107. John Whiteley, of Stapleford, Nottingham—Improvements in warp machinery for producing ornamental and textile fabrics.
1109. Thomas Symes Prideaux, of St. John's-wood—Improvements in propelling vessels.
1182. George Stiff, of Minerva Cottage, Christchurch-road, Brixton-hill—Invention of an improved construction of printing-machine.
1183. William Thomas, of Cheapside—Improvements in weaving narrow fabrics for binding.
1249. Samuel Schollick, of Ulverstone—Improvements in ship building
1295. Alphonse Rene le Mire de Normandy, of Judd-street—Improvements in regulating the pressure of steam
1297. Theophilus Westhorp, of the West India-road, Poplar—Improvements in the manufacture of oakum.
1334. William Brookes, of 73, Chancery-lane—Improvements in stoves and grates or fire-places. (A communication

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| July 25 | 3492 | Tap. | Cowley and Madeley | Walsall. |
| ,, ,, | 3493 | Barlow's Kaleidoscopic Meat-screen. | James Barlow | 14, King William-street, C |
| ,, 26 | 3494 | Guiding Parts of Cocks and Taps. | John Warner and Sons | Crescent, Jewin-street, C |
| ,, ,, | 3495 | Improved Scarificator. | James Coxeter | 23, Grafton-street East, T- tenham-court Road |

# SOCIETY OF ARTS.

### FRIDAY, AUGUST 5th, 1853.

## NOTICE TO INSTITUTIONS.

The Collection of Photographs which the Council undertook to form to be circulated throughout the country, and exhibited at the different Literary and Scientific Institutions, and Mechanics' Institutes in Union with the Society, is now ready. Institutions desirous of having it sent to them, are requested to make application to the Secretary. The Collection will be forwarded to Institutions in the order of their application.

The following Institution has been taken into Union since the last announcement:

284. Tamworth, Reading Room.

## MATHEMATICAL INSTRUMENTS.

The Council of the Society of Arts will be glad to receive samples of the best Mathematical Instruments which any dealer or manufacturer is willing to supply to the public retail for half-a-crown; and where such instruments appear to be suitable for educational purposes, the Council will give them every publicity which their operations admit of. Further particulars, as well as a pattern of the instruments hitherto approved, may be seen on application at the Society House.

## THE PAPER DUTY.

### QUERIES PROPOSED BY THE SOCIETY OF ARTS, MAY 4th, 1853.

### No. 4.—To Publishers.

The Three previous sets of Queries and Replies on this subject, addressed respectively to Manufacturers, to Wholesale Stationers, and to Manufacturers from Paper and Manufacturers using it, were published in Nos. 33, 34, and 36 of this Journal, pages 401, 413, and 437.

### 1. Has the Paper Duty any injurious influence in increasing the price of Books?

Messrs. W. and R. Chambers say, "It must enhance the price of all books, dear as well as cheap; but in the former class it is generally thought by publishers to be of little account."

Mr. J. Chapman says, "Yes."

Mr. C. D. Collet says, "Yes."

Messrs. Groombridge and Sons say, "Yes."

Messrs. Ingram, Cooke, and Co. say, "Yes."

Messrs. W. and A. K. Johnston say, "Not in our opinion."

Messrs. Macmillan and Co. say, "We fancy it would make no perceptible difference on such books as we publish."

Mr. W. Pickering says, "In my opinion, very little."

Messrs. F. and J. Rivington say, "Yes."

Mr. Effingham Wilson says, "Certainly; the average weight of a ream of demy, on which pamphlets are usually printed, is 20 lbs., the duty upon which is 2*s*. 6*d*. The manufacturer adds at least 2*s*. 6*d*. more for capital *thus* paid."

### 2. Is the burden of the Tax much increased before the Paper comes into use?

Messrs. W. and R. Chambers "are accustomed to consider it as ultimately not less than 2*d*. per lb., but upon vague data only."

Mr. J. Chapman says, "Yes."

Mr. C. D. Collet says, "By the charges of middlemen, who charge interest not only on the price of the paper but on the duty; without the duty books might be printed at the mill, and the middlemen got rid of."

Messrs. Groombridge and Sons say, "It probably is, by the addition of interest for the advance of capital in payment of duty before the stock is sold."

Messrs. Ingram, Cooke, and Co. say, "Yes."

Messrs. W. and A. K. Johnston say, "Our consumption being chiefly of the finer qualities, and for maps and atlases, we think these questions would be better answered by a letter-press printer."

Messrs. Macmillan and Co. say, "We don't know; but we should imagine the maker and wholesale stationer must have profit on the outlay."

Mr. W. Pickering says, "Only to a fractional extent."

Mr. E. Wilson says, "No doubt, by the capital lying dead."

### 3. Does it compel in many cases the heavy additional expense of stereotype plates on account of the risk of sinking capital in a large impression of a book on taxed Paper?

Messrs. W. and R. Chambers say, "We stereotype nearly every book we publish, at any rate; so we cannot say the paper duty affects us on this point."

Mr. J. Chapman says, "Yes."

Mr. C. D. Collet says, "Probably."

Messrs. Groombridge and Sons say, "We should not abandon stereotyping if the duty were repealed."

Messrs. Ingram, Cooke, and Co., say, "Yes."

Messrs. Macmillan and Co. say, "We can hardly think this could ever be the case—the duty being such a mere fraction of the outlay, even adding a liberal profit for the 'maker' and the wholesale stationer."

Mr. W. Pickering says, that "Heavy composition and slow sale are the motives for stereotyping; the cost of paper is, of course, considered, but the tax very slightly."

Mr. E. Wilson says, "It does."

### 4. Does it press most heavily upon cheap works intended for large circulation?

Messrs. W. and R. Chambers say, "Decidedly, as the paper is there the chief element. Slight as is the share it constitutes in a cheap sheet, it would in itself be a profit on works of that kind."

Mr. J. Chapman says, "Yes."

Mr. C. D. Collet says, "Of this there can be no doubt."

Messrs. Groombridge and Sons say, "Certainly."

Messrs. Ingram, Cooke, and Co., say, "Yes."

Messrs. Macmillan and Co. say, "We do not know."

Mr. W. Pickering says, "I have never published works of this class, therefore am not competent to say."

Messrs. F. and J. Rivington say, "Yes."

Mr. E. Wilson says, "Yes."

### 5. Does it compel the use of thin and inferior paper in cheap works, and thus make an invidious distinction between literature for the few and literature for the many?

Messrs. W. and R. Chambers say, "It compels the use of thin paper; and we could give a much superior paper were the tax removed."

Mr. J. Chapman says, "Yes."

Mr. C. D. Collet says, "Yes; and the high price of postage of unstamped periodicals has a similar effect."

Messrs. Groombridge and Sons say, "Yes."

Messrs. Ingram, Cooke, and Co., say, "Yes."

Messrs. Macmillan and Co. say "We do not know."

Mr. W. Pickering says, "Very common paper is now seldom used, and the difference between fine and common is little noticed by the many."

Mr. E. Wilson says, "Certainly."

### 6. Has it checked the production of reprints and serials ?

Messrs. W. and R. Chambers say, "Greatly so."

Mr. J. Chapman says, "Yes."

Mr. C. D. Collet says, "Not nearly so much as the stamp and advertisement duties; it acts rather on the quality and quantity than on the number of serials."

Messrs. Groombridge and Sons say, "Not to a great extent."

Messrs. Ingram, Cooke, and Co., say, "Yes."

Messrs. Macmillan and Co. say, "We do not know."

Mr. W. Pickering says, "I am not aware."

Mr. E. Wilson says, "No doubt."

### 7. Has it hindered the public from obtaining easy access to works, the copyright of which has expired ?

Messrs. W. and R. Chambers say, "It forms a great burden on such works."

Mr. J. Chapman says, "Yes."

Mr. C. D. Collet says, "I do not know."

Messrs. Groombridge and Sons say, "We think not."

Messrs. Ingram, Cooke, and Co., say, "Yes."

Messrs. Macmillan and Co. say, "We know nothing of such books."

Mr. W. Pickering says, "It may have done so, but has not had that effect upon me. The interminable extent (or nearly so) of the last copyright Act will greatly affect the literature of the present time."

Mr. E. Wilson says, "Certainly."

### 8. Does it limit the number of copies in editions by increasing the risk of publication ?

Messrs. W. and R. Chambers say, "It bears its part in the expense of paper, &c., in limiting impressions."

Mr. J. Chapman says, "Yes."

Mr. C. D. Collet says, "Of course."

Messrs. Groombridge and Sons say, "Yes."

Messrs. Ingram, Cooke, and Co., say, "Yes."

Messrs. Macmillan and Co. say, "Not of such books as we know about, which are limited in sale, because so very few have education enough to read them, and still fewer the capacity or taste."

Mr. W. Pickering says, "I think not."

Mr. E. Wilson says, "No doubt, as large numbers alone can pay."

### 9. Does it diminish profits by increasing the cost of stock ? and does it operate most severely upon an unsuccessful book, by becoming a tax upon waste-paper ?

Messrs. W. and R. Chambers say, "It is a punishment by the Government upon an unsuccessful book."

Mr. C. Chapman says, "Yes."

Mr. C. D. Collet says, "Doubtless."

Messrs. Groombridge and Sons say, "Yes."

Messrs. Ingram, Cooke, and Co., say, "Yes."

Messrs. Macmillan and Co. say, "Not of such books as *we* know about, as they are limited in sale, and the composition is the chief part of the expense. Might there not be a drawback allowed on unsuccessful books?

Mr. W. Pickering says, "To a certain extent, it must. The Society might offer a reward for a cheap process of bleaching printed paper, and taking out the ink."

Messrs. F. and I. Rivington say, "Yes."

Mr. E. Wilson says, "Most assuredly."

### 10. Does it encourage literary piracy, and the substitution of foreign books for those of English authors ?"

Messrs. W. and R. Chambers say, "We are not aware of its acting in this manner."

Mr. J. Chapman says, "Yes."

Mr. C. D. Collet says, "Yes."

Messrs. Groombridge and Sons say, "The law of copyright prevents piracy, and foreign reprints of English copyrights are prohibited."

Messrs. Ingram, Cooke, and Co., say, "Yes."

Messrs. Macmillan and Co. say, "The expense of labour in this country, and also the copyright, is more likely to be the temptation to piracy."

Mr. W. Pickering says, "I am not aware that it does; the copyright Act will do so in time."

Mr. E. Wilson says, "Unquestionably."

### 11. Please to state any facts relative to the above, or any other points bearing on this inquiry ?

Messrs. W. and R. Chambers say, "It exercises a severely repressive effect upon all kinds of popular literature, including school-books and others designed for instruction and moral improvement. Were it removed, the starting of cheap serial works and publication of others would be greatly facilitated, and the materials of works of which the price is not alterable would be improved. Of a cheap weekly sheet, published by W. and R. Chambers, for the enlightenment of the humbler classes of society, the quantity sold is just about enough to clear expenses. Remove the Paper Duty, and the publishers would have a profit, and consequently be encouraged to carry on the work, which at present they are not."

Mr. J. Chapman says, "See article on 'Commerce of Literature,' in *Westminster Review*. I cannot answer the above questions better than by reference to that article."

Mr. C. D. Collet says, "The *Potteries Free Press*, a penny paper, paid on its sale of 2,400 per week, a duty of 9*s.* 4*d.* to Government, and nothing to its editor. The repeal of the duty would have caused a saving in price to the amount of 1*l.* per week, which would be a tolerable salary for editing a *country* penny paper."

Messrs. Groombridge and Sons say, "We are of opinion that many serial works are discontinued, which would be carried on if the Paper Duty was abandoned; in other words, they would pay their expenses. It is probable that the Paper Duty confines the manufacture of paper to large capitalists only, whereby the price is maintained at a higher scale than it would be were more makers in the field."

Messrs. Ingram, Cooke, and Co., say, "The paper tax is a great hindrance to enterprise in paper-making and in book-publishing. We export largely, and the time wasted in obtaining drawback is most inconvenient."

Messrs. W. and A. K. Johnston say, "We do not anticipate much advantage to the public from the reduction of the duty on paper, as we believe the difference would all go into the pockets of the manufacturers. In our own works we could make no deduction whatever. Our *Physical Atlas*, for example, sells at 10*l.* 10*s.*; the duty on it amounts to 2*s.* 3*d.* Our Charts, selling at 3*l.* 3*s.*, do not pay 2*d.* or 3*d.* duty; and all our other works in proportion. Were the duty taken off, and the price of paper reduced, we would of course be gainers, to a large amount, per annum; but we candidly confess we do not think the public would gain at all by the change. If the duty were taken off, the public would look for reductions we could not make, and consequently we would not do anything to encourage it being taken off."

Messrs. Macmillan and Co. say, "Our knowledge of publishing is so very limited (as you will see by the above answers), that we feel they will be of little use to you. We can hardly imagine that the repeal of this duty would answer any other purpose than to increase the wealth of rich publishers. But as we know so little of the matter, we do not feel sure."

Mr. W. Pickering says, "Nothing occurs to me as being so injurious to English literature as the absurd period to which copyright is extended."

Mr. E. Wilson says, "I believe it is the general practice of manufacturers to double the duty paid."

## ON COMMON SALT — THE SOURCES FROM WHENCE OBTAINED, AND THE PROCESSES INVOLVED IN ITS MANUFACTURE. WITH OBSERVATIONS ON THE ORIGIN OF SALT AND OTHER SALINE BODIES.

BY W. BOLLAERT, F.R.G.S.

In accordance with the request for an essay "On Salt, the Sources from whence it is obtained, and the Processes involved in its Manufacture," the author proposes to treat more on the two first points than on the third, in consequence of his observations having been directed to the origin of salt, in the working out of which he was led to examine the sources from whence obtained, with the object of strengthening the views he had formed as to its primary formation. In 1826, being in Peru, and observing large quantities of saline matter in the Andes, at an elevation of 14,000 feet and upwards above the level of the sea, the author began to entertain serious doubts whether the ocean ever had anything to do with saline deposits at elevations much above the level of the sea. Subsequently, being in the North of Mexico, and in other localities, he again had opportunities of examining various saline districts. He was then led to conclude that the origin of salt and other saline bodies must be chiefly looked upon as volcanic, some being produced by the decomposition of rocks containing the bases of the saline materials.

Dr. Daubeny was one of the first to draw attention to the fact that salt and muriatic acid were among the abundant products of volcanoes, and his remarks made more than a quarter of a century since, fortified the opinion the author of this essay arrived at in Peru in 1826, that the greater portion of salt found from the Andes to the coast may claim a volcanic origin.

Salt, muriate of soda, or chloride of sodium, in one state or another, exists abundantly in the earth, on its surface, in the ocean, in the air, rain, in plants and animal bodies, and also in some meteoric stones. The knowledge and use of it by men is often referred to in the early pages of the Bible.

Lately a medical man (Dr. Howard) has written on the baneful effects of salt both on body and mind, stating that it produced consumption. Another gentleman of the same profession highly recommends a certain "condiment," which is mainly composed of salt. We are well aware how unpalatable food is without it; also, that a long continuance of salt provisions produces scurvy; but that a moderate quantity is absolutely necessary for our healthy existence no one can doubt: indeed, salt, next to bread, is the most important necessary of life, and one of the most interesting British minerals.

The principal consumption of salt in Britain is in the seasoning and preserving of food, the furnishing of chlorine to the bleacher, in the manufacture of muriatic acid and carbonate of soda, as a glaze for coarse pottery, in glass and soap-making, in smelting metals, in dyeing, and many other processes of the arts.

### EUROPE.

England produces bay or sea salt, rock or fossil salt, and salt derived from brine springs. Since the historic period, we know that the ocean has been called the salt sea; however, posterior to this, to what extent the great mass of water was saline is a problem. The result of late researches goes to show that the saline matters in the waters of the southern hemisphere exceed those of the northern; that the Atlantic contains more than the Pacific; and that the sea is less dense at the Equator and the poles, arising from rains and the melting of polar ice. Dr. Ure found 1,000 parts of sea-water from the Red Sea, at Berenice, to yield 43 parts of saline matter. Dr. Buist, in the same quantity, from the waters of the Gulf of Suez, 40; approaching Bombay, 39; and off the Canaries, 44. It may be said that the waters of the ocean contain from about 3½ to 4 per cent. of saline and other bodies, common salt about 2½ per cent. predominating; then follow chlorides of potassium and magnesium, sulphates of magnesia and lime, carbonate of lime and magnesia, carbonic acid, iodides and bromides, ammonia, and silicic acid; free chlorine is also said to have been detected. According to some French chemists, copper, lead, and silver, are said to have been found in the waters of the ocean. The analyses of sea water show that the various seas differ in the quantity and character of their contents, which must be owing to varying saline matters washed into them, as well as to the effect of cold, in the Arctic and Antarctic regions, which has the property of producing great chemical changes, and thus affects the composition of sea water.

With the above observations on sea water, we will proceed to the subject of salt obtained from the waters of the ocean in England, such being known as sea salt, and prepared from the earliest times on the southern shores of the island. The plan resorted to was to allow sea water to collect on the surface of the earth during the summer, when solar evaporation went on to a certain extent, forming brine, which was conveyed to iron pans, and boiled; as the solution became saturated, the salt separated, and was skimmed off the surface; it was then drained and dried. With the discovery of brine springs and rock salt, the manufacture of sea salt has declined.

Brine springs are particularly abundant in Cheshire, yielding sometimes as much as 20 per cent. of salt, which, when manufactured, is known as white or boiled salt. In the coal formation of Durham, at Batley, a spring yields 26·400 gallons in twenty-four hours, and gives in 100 parts:

| | |
|---|---|
| Salt | 87 |
| Chloride of Calcium | 43 |
| Carbonate of Lime and Silica | 4 |
| | 100 |

The brine at St. Laurence, near Newcastle, gave from one gallon, weighing 403,840 grains:

| | |
|---|---|
| Salt | 72·8 |
| Chloride of Calcium | 21·1 |
| Chloride of Magnesium | 4·8 |
| Sulphate of Lime | 1·1 |
| Iron | 0·2 |
| | 100·0 |

In the Newcastle coal field, the brine comes up through the floor of coal, at a high temperature, and holds three times more salt in solution than sea-water; it flows from a fissure in one of the dykes, and its origin is very deeply seated. It would have been natural to conclude that brine springs had their origin from masses of rock-salt in the bowels of the earth, for fossil salt had been known to exist from early times, and in various parts of the world; however,

Rock or Native Salt was first discovered in this country at Northwich, in 1670, in beds, or rather masses, accompanied by indurated clays, and much sulphate of lime. On making a horizontal section of a bed of rock-salt, various figures are observed. The lines forming the boundaries of these orbicular masses consist of pure salt; in other parts earthy matters are mixed with the saline. May we not here suppose that the primary origin of the salt is volcanic?—having been formed from its elements in the interior of the earth, it would be ejected in a fused state, or in vapour, through fissures, or as a boiling saturated solution, at times with mud, and fine particles of rock. In the saliferous marls of the new-red sandstone in England, volcanic scoriæ have been found. Repetitions of such volcanic action have occurred, which would account for the several layers, or rather masses of salt and brine springs, found in what is called saliferous strata, as well as amongst primary rocks. This species of volcanic action has taken place at different periods, and at various elevations; and in this way we may probably account for the existence of rock-salt generally. Some rock salt is deposited by sublimation from volcanoes; this it is proposed to call primary. Salt and saline bodies, in general formed in elevated regions, would be dissolved by rains and melting snows. Brine springs would appear in lower regions, which would give rise to local deposits, to be again washed downwards by streams into lakes; these would overflow, and be discharged by rivers into the sea. To the author, a strong proof of the primary origin of rock salt, and that it has not been formed from sea-water, is its chemical composition. A specimen examined by Dr. Henry, from Cheshire, gave chloride of sodium 98·32 per cent. That of Vic, as stated by Dr. Ure, gave chloride of sodium 29·300; sulphate of lime, 00·005; clay and insoluble matters, 00·020. The red variety of Vic gave 99·80 of salt. How different the composition of this rock or fossil salt, from the saline and solid contents of sea water, and which points to a different origin. It appears, then, that we must abandon the idea that rock salt has had its origin from the ocean; for if it had, we ought to find it to be composed of about the same quantities and qualities of matter as are met with in sea-water. The ocean contains barely 4 per cent. of saline matters, and the author is led to conjecture that the sea was less salt in former times, and that originally it may have been fresh water. If this view be correct, the sea is getting gradually salter, but at what rate there is no data to show. Could such be ascertained, we might calculate a period when the ocean would be saturated, and commence depositing its saline contents.

During the war the duty on salt was 30*l.* per ton, when it produced a revenue of 1,500,000*l.* It was repealed in 1823. The average price of eight varieties of salt at the works, in Cheshire, in December, 1852, was from 3*s.* 6*d.* to 12*s.* per ton for rock salt; for stoved bagged, common white, it was 6*s.* per ton. It has been calculated that each individual in Great Britain consumes about 25 lbs. of salt annually. Taking the population at 27,019,572, this will give, as the amount of

| | |
|---|---|
| consumption . . . . . . . | 301,558 tons. |
| The exports in 1845 were 360,000 tons. | |
| At present (5th Jan., 1853), it may be estimated at . . . . . | 496,649 „ |
| Consumed in various manufactures, and as a fertilizer . . . . . | 200,000 „ |
| Tons . | 998,207 |

Calculating the average value at the pit's mouth at 7*s.* per ton, this will give a value of 349,322*l.* Four fifths of British salt is made or raised in Cheshire. There are twenty-nine salt mines in that county, and ninety-seven salt-works. One million of capital is invested by forty-seven proprietors, employing some 5,000 people. From 1810 to 1817, under the high duties, 2,100,000 bushels were annually made. From 1827 to 1834, after the duty was abolished, 10,307,752 baskets were manufactured.

Scotland.—A small quantity of sea salt is still manufactured.

Ireland imports much salt from England. The red marls of Carrickfergus are 800 feet thick, the lower 120 feet of which is a bed of rock salt. Colonel Portlock contends that it could not have had its origin from igneous action at the bottom of the sea, because sea-water is a very diluted solution of salt, and that the presence of rock salt cannot be considered as indicative of any class of rocks. It is said that there are indications of the existence of borax in Ireland.

France.—Some sea salt is made on the north coast, but the greater portion is obtained from the ocean lagoons in the Mediterranean. The Japanese method of making salt has been practised on the coast of Lower Normandy since the ninth century. This consists in collecting the sand of the sea-shore, which has been left dry by the tide, and forming it into a kind of filter, through which sea-water is allowed to percolate; its strength is thereby increased, and it is then evaporated to dryness. The recent interesting researches of M. Balard on sea-water and the bittern of the salt lagoons of Heraut, show that when sea-water has furnished the greater part of its salt, it easily yields, amongst other products—1. Sulphate of soda; 2. Chloride of potassium; 3. Chloride of magnesium: all of which have a commercial value. From the first is manufactured soda, for the use of the soap-makers and others; the second can be easily converted into artificial potash; and the last has only to be heated to yield muriatic acid. Salt, saline, and acidulous springs, are met with in various parts of France, and at St. Nectaire in Auvergne, a hot saline spring rises through granite. Rock salt exists in six different masses at Vic, in the Meurthe. The annual consumption in France by each individual is about 19 lbs. The value of sea salt for 1844 was more than 462,000*l.* There is still a considerable duty imposed on salt; and it is asserted, that the oppresive Salt Laws, which sent from 4,000 to 5,000 persons to prison annually, had no inconsiderable share in bringing about the great French revolution.

**Belgium.**—Some sea salt is manufactured on its coasts, but the greater portion is supplied by England.

**Holland** imports principally from England. In Belgium and Holland the annual individual consumption is about 20lbs.

**Spain.**—Much bay salt is procured from the sea-shore near Cadiz. The salinas, or salt-pans, are very extensive; the whole of the evaporation being carried on by solar heat. Heaps of salt may be seen, containing from 3,000 to 4,000 tons. The inexhaustible rock salt mass of Cardona, which gives rise to brine springs, is 1,500 feet above the sea, composing a mass of salt three miles in circumference, and from 400 to 500 feet high. Some of it is very pure; but usually clay and selenite accompany it. Catalonia is characterised by ridges running north-east and south-west; the former are interfered with by intrusive rocks of granite, porphyry, and lava. The oldest sedimentary rocks are schists resting on granite; on these repose mountain limestone, with beds of coal and red marly sandstones, with rock salt. An isolated batch of the latter supplies the salt of Cardona. Cardona being the property of the Crown, is worked on its account, the salt selling at the rate of 7*s.* 6*d.* per 130 lbs. There is another collection of rock salt at Minglanilla in Valencia. It is one enormous block, and not scattered in layers; 50,000 bushels are annually extracted. Salt lakes, springs, and even salt streams, are met with in various parts of the country. Glauberite is found in Murcia imbedded in rock salt. Nitrate of potash is met with at Zaragosa; and at Merida there is a natron lake. Near the Vega of Grenada there are salt-pits.

In one of the Cape de Verd Islands, known as Salt Island, the article is formed by solar evaporation, in natural ponds among the rocks. The greater portion is exported to Buenos Ayres, for the large quantity of salt found on the great plains of that country, being of a different chemical composition, is not found to be so well adapted to the purposes of preserving meat as bay salt, on account of its being nearly a pure chloride of sodium, and not containing the deliquescent chlorides. In the *Encyclopædia Britannica* (1797 edition) it is remarked that British salt from brine springs is not so good for curing provisions as that of Spain and France. Dr. Henry was employed by the Cheshire salt makers to disprove this; but his statement is not satisfactory.

**Portugal.**—A very large quantity of bay salt is procured by solar heat in the sea lagoons of St. Ubes. The greater portion is exported to Newfoundland, for the curing of cod fish: 500,000 bushels are sent to England. There are above 200 saline and mineral springs in Portugal, and it is said that rock salt is met with in the interior.

In **Switzerland**, brine springs abound. Those of Bex contain 14 per cent. of salt. The salt formation of Bex has been referred by some writers to the transition series of rocks.

**Hanover.**—There are important salt-works at Salgetter. Brine springs occur in many of the smaller German states.

**Prussia.**—Salt mines exist at Gottesgabe, and other places. The brine springs of Halle yield 300,000 tons annually, selling for about 268,000*l.* Each individual consumes annually about 20lbs. of salt.

**Hesse.**—Salt and lignite-works are found at Salhausen. At the salt-works of Kreuzenach, the mother-liquor produces iodine and bromine.

**Saxony.**—Brine springs are met with in few places, but as they are only slightly impregnated with salt, evaporation by means of fuel would be too costly a method of obtaining it. The process of graduation by thorn houses, as adopted in Sardinia, was introduced into Saxony in 1559.

**Bavaria.**—Berechtesgaden yields annually 7,500 tons of rock salt. There are other spots yielding this mineral. Kissingen has salt-mines and brine springs.

**Baden.**—Rock salt is procured in abundance in the Black Forest; there are also brine springs.

**Brunswick** has four principal salt-works from brine springs. Boracite is found in the gypsum of the Kalkberg. At Lippe Detmold, to the west of Hanover, there is a brine spring yielding annually 36,000 bushels of salt.

**Wurtemburg.**—The salt-works are the property of the crown, and produce 24,000 tons annually. At Halle the brine-springs produce 90,000 cwt. annually. From the section of the rock salt in the Muschelkalk at Wimpfen, it will be seen that gypsum is enclosed by a deep layer of shell limestone, containing salt as a separate mass. Some writers have supposed that this mass of salt has been deposited by the sea, or by saline lakes: but Dr. M'Culloch says, "They are special and original deposits in whatever way produced; as of the design we cannot doubt, though no other end should have been in view, than the uses of this substance to man." At Wimpfen the gypsum is well developed; indeed, the substance is a generally accompanying compound all over the world, wherever salt in its various forms occur.

**Denmark** imports 600,000 bushels per annum from England.

**Sweden** and **Norway** import about 250,000 bushels of salt per annum from England. In Jutland the salt fogs are very injurious to the foliage of trees, and hurtful to grass.

**Austria.**—A small portion of bay salt is made on the south shores; a large quantity from brine springs, of which there are, including those of a mineral character, as many as 1,500. The largest masses of rock salt in Europe are those of Bochnia and Vieliezka; numerous other masses are met with along each side of the Carpathian Mountains, extending into Moldavia and Suabia. Some geologists state that this great salt deposit of Austria forms a distinct member in the series of stratified rocks, occurring with limestone, clay, gypsum, stinkstone, slate, and not unfrequently with bituminous formations; and it may also be remarked that the deposits, or masses of salt among rocks of all ages, is an interesting and important fact. Bochnia and Vieliezka produce 900,000 cwt. annually; 200,000 of which goes to Prussia, 150,000 to Russia, at such prices as will remunerate the Austrian government; the remaining quantity is sold at arbitrary prices. The cost price of salt sold in Prussia and Russia is about 20*d.* per cwt., while the Austrian government sells it at *five times* that price to its own subjects. Ischl, in Upper Austria, yields rock salt, and the mountain that contains it has many chambers, which are filled with fresh water, so as to dissolve the salt; it is then drained off and conducted to the boiling-houses in the town of Ischl. The rock salt-mines of the Tyrol near Hall, in the valley of the Inn, are made to yield salt as at Ischl. 120,000 cwt. are produced annually, yielding 100,000*l.*, but leaving a clear revenue to the crown of 80,000*l.* Thorenberg, in Transylvania, produces annually 250,000 cwt. of salt. This useful mineral is found plentifully in Croatia, Moravia, Sambar, Styria, Bohemia, &c., &c. In the Transylvanian district of Austria alone, there is sufficient salt to supply Europe for thousands of years. The Platten Sea, or Balaton

Lake in Hungary, forty-six miles long, and twenty-seven to thirty-six feet deep, also yields salt. The annual consumption of each person is 20lbs.

**Russia** and **Poland** for the most part form one vast plain, which is bounded on the east by the Ural Mountains; and on the south by the Carpathian and Silesian chains. In Poland, in the tertiary strata, there occurs a most extensive deposit of salt. Sir Roderick Murchison, in speaking of the salt steppes of the Orenberg, says, the surface consists of gypceous marls and sands, of the age of the Zechstein. He thinks that the rock salt and brine springs occur all over the lower sedimentary rocks of Russia, from great depths below the old red sandstone to the Zechstein, and the overlying marls and sandstones, and that this is pierced in the vicinity of the salt-works of Illetzkaya, by small pyramids of rock salt. In some parts of Asiatic Russia salt is obtained by the congelation of sea water; one of the effects of a low temperature is to decompose a portion of the salt, and to convert the sulphate of magnesia of the brine into sulphate of soda and chloride of magnesium. In Poland, salt is found to be accumulating in lakes and marshes, the saline matter being washed down from superior elevations. Vast quantities of salt—sometimes called rock salt, but which ought rather to be denominated surface salt—occur in the parched plains of the Kirghis and elsewhere; and also around the Caspian and Aral. Nitre is found in some parts of Russia. The produce of the Russian salt-mines in 1833 was 491,862,299 kilogrammes. The water of the Caspian Sea is as salt as that of the ocean, and also even more bitter. That of Lake Aral is less so; salt-bearing rocks have been discovered in the vicinity of the latter lake. Lake Aral, as well as some others in the Old and New World, are on the decrease, which may be attributed to the varying quantity of moisture in the air. Lieut. Maury, of the United States navy, observes, that in regarding the winds as a geological agent, we can no longer consider them a type of instability. We rather behold in them the light of ancient and faithful chroniclers, which reveal to us truths which Nature has written upon their wings in characters as legible and enduring as she ever engraved on the history of geological events upon the tablet of rock. Lakes Inder and Elton, in Asiatic Russia, yield much salt. The individual annual consumption is 21lbs.

**Sardinia** yields bay salt, particularly at Cagliari. The waters from the brine springs of Moutiers contain 1·83 per cent. of saline matter, which are most economically evaporated by passing them through Thorn Houses. When concentrated to 12 per cent., sulphate of lime is deposited on the twigs. At Moutiers 2,250,000 lbs. of salt is annually made, and 187,000 lbs. of sulphate of soda. The government receives 150,000 francs for the products, bearing a profit of 50,000 francs.

**Tuscany.**—Some bay salt is collected on the coasts. Rock salt is procured from the mines of San Leopold. Salt is also made from brine springs. Boracic acid is found in several muddy lakes, in the midst of which small craters are opening, which disengage aqueous vapours changed into boracic acid, borate and sulphate of ammonia, iron, lime, and other salts. Manufacturers complain of its high price (5*l.* 10*s.* per 205 lbs.), so that the glass manufacturer has to pay about one shilling per pound in its available form of borax as a flux. A new boracic acid mineral is now imported from the province of Tarapaca, in Peru. It is found among the nitrate of soda-beds. Sales have been effected of it in this country, at from 60*l.* to 72*l.* per ton, principally for the Potteries. Thibet is the only other known source of boracic acid, being imported as borax or tincal.

**Naples** and **Sicily.**—Rock, or fossil salt, is met with as a sublimation from volcanoes, particularly at Vesuvius. It is sometimes in masses sufficiently considerable to occasion a contraband trade. Rock salt occurs at Cosenza in cretaceous rocks; and Sir Charles Lyell observes, that there are deposits of gypsum and salt in the blue clay, and veins of it in the limestone formation of Sicily. During the eruption of Etna in 1852, much muriate of Ammonia was given off with the lava, ashes, and sulphurous vapour.

**Lipari Islands.**—Small quantities of boracic acid have been found at Vulcano. Bay salt is also made.

**Greece**, and **Turkey** in Europe.—Rock salt is found in abundance in the Balkan; also in Moldavia and Wallachia. Salt-pans exist on its coasts. Milo exports bay salt.

(*To be continued.*)

## HOME CORRESPONDENCE.

### INVENTORS *versus* PATENTEES.

Sir,—I read with much interest some weeks ago, an ably written letter in the Journal of our Society, on the very important subject of Patent-right, from a correspondent who signed himself "Cosmos;" and I am induced to venture a few remarks upon it, not so much in answer to the rather dashing invitation of a reply with which it winds up, as from a conviction of some years growth, which drew my eye to the title of the letter, and to a perusal that, in spite of a happy phraseology, and some well-turned truths, tended strongly to confirm my views on the opposite side of the argument.

Your correspondent is an advocate, I may say an indignant advocate of Patents; and calls to account, somewhat roundly, Mr. Scott Russell, and the other "eminent persons" whose sentiments he expressed, for reiterating an opinion (by no means confined to any exclusive knot of thinkers), that patents are upon the whole rather injurious than otherwise to the interests of science, and the advancement of the arts; and prejudicial instead of promotive to the objects which the State has in view in granting those limited monopolies to individuals, and instituting an exceptional legislation in their favour, upon grounds of supposed public policy.

And I would beg in the outset to draw your correspondent's attention to these latter words that I have used, because he appears to me, with submission, rather to mistake the ground of the argument throughout his letter, in treating the question too exclusively as one between Patentees and the Public; as though the controversy were about some aboriginal right in the former which it was threatened to deprive them of, instead of as it really is, a question as to the solid truth of the principle upon which the State extends to Patentees the benefit, or supposed benefit, of an exception to the general policy of English law.

I shall probably not be taxing his candour too highly in requesting Cosmos to bear in mind that the proof of the case falls not upon those who question the benefit of patents but on the defenders of them. They are a class protected by exceptional legislation; a thing to be always watched narrowly, and adopted only on the strongest grounds of special claim. Whether these grounds exist, or exist to an extent to justify the aberration of the law from its regular course, is the true question at issue. And if it can be shown that the advancement of science, and its application to the arts is not promoted, nor the efforts of inventors encouraged by the Patent laws, I submit that his case is lost; and that the hardship he assumes would accrue to bonâ fide *Inventors* by the abolition of the law, is illusory.

I say, illusory, because it has been brought to experimental proof over and over again of late years (as if it had not been an axiom of logic and geometry thousands of years ago), that what is best for *all* is best for *each;* that the whole includes all its parts; that what is true of a class is true of all comprehended in the class. The "protectionist" doctrine, in whatever shape it dresses itself, or re-appears, proceeds upon the converse of this proposition, and attempts in fact to invert it. That *that* doctrine is erroneous I am spared the showing; that the argument in favour of patents ranges itself under that doctrine, and is an insidious offshoot of it, I have long believed in principle, and will attempt to show.

But I must, in the first place, take leave to correct the verbal critic who tells Mr. Denison, and the other "eminent persons," that they "have failed in mastering the first principles of patents, or they would not have imagined them an impediment to science;" because, argues he, "A patent is for an *art*, the artificial application of some natural principle—not for the *science* or knowledge *on which the art may be based.*" Doubtless: and had your correspondent himself "mastered the first principles of patents," he would surely have seen the force of the connection which his own pen has followed, and which the State has recognized, in the public policy on which patents are granted, viz., to encourage the advancement of science *by* the protection of its application to special branches of art. In the course of a very few words your correspondent uses the very ellipse he took exception at. A *patent for a science*—the absurdity raised by Cosmos—he is welcome to the nonsense of: but a patent for a particular branch of art, in order to encourage "the science on which the art is based," is intelligible enough. The suppressed premiss of the law,—that the granting of patents *does* thus advance science,—Mr. Denison, with "other eminent persons," doubts the truth of. And so do I. And if Cosmos will be good enough to accept Mr. Scott Russell's short statement of the question, that *Patents instead of advancing, operate as an impediment to science*, we shall have the true issue before us, without any sparring about words or phrases.

Science is public property. True, replies Cosmos, but a special or "artificial" application of it—in short, an "invention,"—is private property, as much as a book is. Granted; but to follow out his own illustration, suppose the possibility of two men writing precisely the same book, unknown to each other, at the same identical time,—to which would he grant the "patent"? Who is the special proprietor of the thoughts contained in the book? The question is absurd, he will say, because the thing is impossible. Then his illustration fails, because *the other* IS possible: and not only possible, but a thing of by no means uncommon occurrence. And for this simple reason, that the unfolding truths of science operate, at each epoch of its advancement, on a whole generation at once, and set many minds at work in the same channel, and in the same drift. For one that takes a patent out, a hundred are at work upon the same vein. All of a sudden the arm of labour is arrested: "Stop! you must not work in those 'diggings' any more! 'Mr. Smart' has got a patent! you must leave them there *placers*, and absquatulate, I guess,—they all belong to 'Mr. Smart.'" The hundred "hands" stop of course. The first thing they do is to read Mr. Smart's "specification;" and there what do they find? The whole ingenuity of language strained to its utmost to specialize and confine to Mr. Smart for fourteen years, all the possibilities of that particular application of science to that particular art. Language is a powerful thing; it may be made to comprehend by inference a great deal more than it actually defines; it may cover *by mere accident of expression*, a great deal that the most ingenious writer was not master of, and never meant. And it need not be pointed out how its aptitude and elasticity in this respect have been the everlasting battle-ground of contested patents. What is the consequence? Why, that patents have become the very synonym of litigation; not less terrific, it is true, to Patentees themselves than to that infinitely larger class of *Inventors* who with equal, possibly superior merit of thought and labour, shrink from an arena strewn like the den of Cacus with ruined fortunes and broken hearts; *vestigia nulla retrorsum!*

Will any body say that this is not justly called (by a most fair ellipse of language) an impediment to Science, who understands how discovery and invention in art *react* upon the advancement of knowledge? Is it not, in fact, true, that it is by discoveries in the various branches and details of art that science chiefly makes progress, just as the tide is brought in by *many* little waves? If a cause be discovered operating in detail to check ninety-nine out of the hundred of these small tributaries, and throw them back upon themselves, may it not be justly said that the flood itself is obstructed?

But, then, the interests of the individuals, Patentees and Inventors—(whom Cosmos, by a curious *petitio principii*, confounds under one head, assuming that in urging the claims of patentees he is the advocate of inventors)—what can be more idle than to bring forward a string of names of patentees, great and small, in proof of the benefit of patents? He might as well give a list of all the old women who have been hanged, drowned, and burnt, in attestation of the doctrine of withcraft. Would his witnesses themselves, if brought into court, give their evidence in his favour? Will those who know their private biography, respectively, be ready to attest the conclusion he assumes? One instance may be little among so many; but for one of the greatest names he quotes, I can myself, from private family resources, speak sadly to the contrary. And for his one instance on the other side,—grant that "Dalton took out no patent and was nearly starved"—had there been *no such things as patents in his day*, would he have been "nearly starved" then? Who shall say so? Who shall say he was not a victim to the very system which, as Mr. Scott Russell well remarks, "compels men to take out patents, not so much to prevent others using them as to secure *to themselves* the right to do so, lest some one else should make a patent of it, and they be prevented using their own discovery." "*While I am coming, another steppeth down before me.*"

Does not Cosmos see that if Dalton was nearly starved, it may have been precisely for the reason Mr. Scott Russell here indicates—not because he "did not take out a patent," but because somebody else *did* who had less right to it? Cannot he see that the very instance he gives may be a case in point for the opposite argument, and that had there been *no* Patent-law in existence for another to make an unfair engine of against the true inventor, Dalton might have had his full rights awarded to him by the public voice? Is it not rather a feeble mode of argument, which, conceiving only the state of things existing under a system of legislation proposed to be abolished, argues upon the results of such abolition *from* the existing phenomena? As who should say, "Dalton walking in the dark, without a torch, lost his way and was drowned,—*ergo*, whoever walks without a candle will be drowned,"—by way of reply to a proposition that daylight is better than torch-light?

Has Cosmos mastered beforehand all the possible phenomena attendant upon the removal of a human law which assumes to patch up a deficiency in God's moral and physical government of the universe? May there not be, after all, in the nature of things, a reward for *ingenuity* as well as for *industry*, which even Cosmos would by degrees come to see if officious "Legislation" would only "get out of the way." Is it only by "Act of Parliament" that we find Labour productive, Industry successful, persevering Genius triumphant, and every other human gift and quality tending to its appropriate and cognate reward? Must poor Ingenuity have a special parliamentary go-cart all to itself, as having been forgotten in the moral fitness of creation, and left to the after-thought of human jurisprudence, and the mercy of St. Stephen's? What can patent laws really *do* for inventive genius followed up by active practical exertion—"What can Alexander do for Diogenes?" "Only get out of my sunshine!" The fact is, that patent laws instead of having vindicated their own utility and excellence in practice, as Cosmos assumes, have done little more than set up a great question in men's minds by their inefficacy for *both* the ends they are intended to achieve, the advancement of science, and the protection of the inventor. By some occult law of mental constitution, it happens that the smart man who sucks his neighbour's brains is naturally the greatest adept at seizing upon such privileges and priorities as "legislation" can afford: whilst in the real history and nature of Inventive Genius the race is not always to the swift, nor is true merit in this more than other departments of human excellence, the most forward to assert, or even to defend, itself. It is true the patent laws do not even profess to discriminate merit, or test originality: "First come, first served," is all their philosophy; with what result let the endless volumes of our law reports declare. But meantime they stifle the public operation of principles the action of which they displace, and virtually assume, by being commonly thought to fulfil them. A list of men who have made fortunes under the existence of patent laws proves no more than would a counter list of those who have been ruined under them. Experimental evidence could only be obtained from a fair comparative history, were that possible, of the progress of invention and discovery, and of the individuals from whom they emanated, during parallel periods *with* patent laws and *without* them. I suspect the result would be such as—if not to convince Cosmos and those who believe in the efficacy of legislation for these purposes—at any rate to suggest that there may be philosophic and substantial foundation for the views of those who venture to doubt the benefit of patent laws, both for the interests of science, and the reward of ingenuity and talent,—amongst whom may be enrolled,

Sir,
Your obedient Servant,
C. W. H.

## STATISTICS OF INSTITUTIONS.

SIR,—I have been for some years the President of a Literary and Scientific Institution in one of the home counties. I have taken a great interest in the union of Institutions with the Society of Arts. I attended both the Conferences of Representatives, and am a regular reader of your Journal.

I have been for some time of opinion that sufficient information respecting the Institutions had not been collected by your Society; and I hail with lively satisfaction the appearance of the new Circular of statistical queries.

My object in writing is to urge upon the Committees and Secretaries the very great importance of exercising the utmost possible care in filling up the blanks of your schedules.

I really think that if they are well filled up by the Institutions, and well digested by your Society, they will form one of the most valuable and instructive documents that has been published in connection with national education and social progress.

I perceive that many of the queries are eminently suggestive; and when the officers of an Institution are compelled to give a negative reply to the 21st, 22nd, 24th, 25th, 26th, 27th, 29th, and 30th questions, it is to be hoped that they may be led to ask themselves "the reason why" they have neither maps, nor museum, nor local prints, nor recreation ground, nor excursions, nor soirées, nor exhibitions, nor any connection with the neighbouring schools.

With reference to the third query, I would suggest that in large populations having no Institutes, an effort to establish them might properly be made by the Society of Arts.

With reference to the 4th, I would observe that in my own Institution, we have three classes of subscribers, paying a guinea, half-a-guinea, and a crown per annum; and that the first class alone manages our affairs. I have long been anxious to admit all three classes to the management; and I shall look with great interest for the replies to your 9th Query.

The 10th Query, respecting the Classification of Subscribers according to rank, profession, &c., must elicit very curious and interesting information. Are the Institutions countenanced by the neighbouring peers, by the local magistrates, by the representatives of the people? Do the Clergy of the Established Church hold aloof? Do the Dissenting Ministers come forward? Do the farmers as well as the shopkeepers, the agricultural as well as the urban labourers, subscribe to the Institute? Is the fair sex fairly represented there? Is the rising generation, with its pupil teachers and model schemes of education, entering there in adequate numbers?

The classification of the books circulated will exhibit some curious results. It may be a troublesome job to the Librarians; but its very great importance will lead them, it is to be hoped, to grudge no trouble that may be requisite to ensure a faithful return.

I could wish that you had inquired not only what number of Lectures have been delivered, but what were their subjects, under general heads, such as literary, scientific, &c.

I trust that no Institution will hesitate to give full particulars respecting its tenure and its financial condition. We must not imagine that the full benefits, or indeed any of the real benefits, of our union with your Society can result from your operation without our own hearty, active, and continuous co-operation. It is our place to furnish information, the raw material, which it is your place to receive, to sort and arrange, to work up, and to re-produce in a shape that will be at once interesting and useful to ourselves and to the public at large. I am, Sir,

Your faithful Servant,
A PRESIDENT.

## TREATMENT OF FLAX.

Flax Works, Crediton,
August 3rd, 1853.

SIR,—I have read with much interest the paper in the last number of the Society's Journal, relative to the cultivation of flax in India.

What is wanted there and elsewhere to render flax a profitable and desirable crop, I believe to be cheap and efficacious machinery, for separating the fibre from the straw without steeping or retting it. If not, why is it not more generally grown? Spinners unfortunately are at present strongly prejudiced in favour of steeped flax; and for very fine yarns *well-steeped* flax has undoubtedly some advantages; but considering the great difficulty and risk of the process, and the very large proportion of flax that is injured by it, through want of necessary care and skill, and rendered unfit for any but inferior purposes, I feel confident they would find their interest in promoting and encouraging the preparation of flax without steeping.

Flax of greater strength, and of good medium quality, may at all events be uniformly obtained from unsteeped flax, and I believe it only requires a proper system of flax treatment of this kind to be introduced, in order to the free and extensive growth of this important raw material; whilst its greatly diminished cost, consequent on such treatment, would place "clean linen" far more within reach of the humbler classes than it is at present, and largely increase the general use and consumption of flax.

I send you a sample of bleached flax yarn, spun from flax of my own growth, and prepared without steeping or retting, by machinery which I have just patented in the United Kingdom. As soon as I have completed my foreign patents, I shall be happy to give you some description of it, and of my accompanying new mode of bleaching.

Meantime, I remain, yours faithfully,
EDWARD DAVY.

## GRATUITOUS LECTURERS.

Highgate Literary and Scientific Institution,
1st August, 1853.

SIR,—With reference to the forthcoming list of Lecturers recommended by Institutions in Union with the Society of Arts, I have been looking over a list of those who have lectured at this Institution, from its foundation, in January 1839, up to the present time; and I have been much struck by the number and excellence of our gratuitous Lecturers.

Exclusive of concerts, musical entertainments, Shakspearian readings, polyphonics, dissolving views, and conjurings—for we do not despise such amusements here—we have had 207 Lecturers; and of these 126 have been gratuitous; and only 81 have been paid for.

Among the gratuitous Lecturers were the following clergymen:—the Rev. R. C. Smith, now of the Rectory, Stepney; the Rev. Derwent Coleridge, Saint Mark's, Chelsea; the Rev. R. G. Gleig, Chaplain General to the Forces; the (late) Rev. Thomas Streatfield; the Rev. Gerard Smith, then of Cantley, Yorkshire; the Rev. Lewis Evans, now of Sandbach, Cheshire; the Rev. George Williams, Saint Columba's; the Rev. Richard Burgess, Upper Chelsea; the Rev. William Harness, of Knightsbridge; the Rev. Thomas Jackson, formerly Bishop Designate of Lyttelton; the Rev. James Booth, Society of Arts. All of their lectures were good, and some of them very admirable. We have also had capital gratuitous Lectures from Mr. R. D. Grainger (who fortunately for us lives here); from Mr. Le Gros Clark; Dr. Latham; Mr. Henry Reeve; Mr. Hullah; the late Mr. Butler Williams; Mr. C. Woodward, F.R.S.; Mr. Sowerby; the late Professor Cowper; Mr. J. E. Gray and others.

It will be seen on comparing our gratuitous lectures with our paid ones, that the former are to the latter in point of number as rather more than three to two; and in point of quality I do not hesitate to say that the unpaid lectures have been at least equal to the others. I hope therefore that the Institutions will not too readily adopt the conclusion that gratuitous lectures are valueless.

I am, Sir,
Your obedient Servant,
HARRY CHESTER.

## THE PAPER DUTY.

6, Halkin-street West, Belgrave-square,
Aug. 2nd, 1853.

SIR,—Perceiving that you are continuing in the Journal of our Society the list of Queries and Answers in reference to the Paper Duty, I beg to trouble you with the following facts, to show the prejudicial influence the present duty has upon the papier maché trade, offering, at it were, a premium to the inferior manufacturers in this material.

The best quality of papier maché articles are produced by sheet paper, pasted upon moulds, or pressed in dies, and the whole of this paper, including the waste (which forms a considerable proportion of the quantity used), pays the duty of 1½*d*. per pound, while the *pulp* of paper from which the inferior goods are produced pays no duty whatever, unless manufactured into boards not exceeding a quarter of an inch thick, which are chargeable with duty, to prevent their being used instead of mill board, to the disadvantage of the revenue.

Some years ago our firm called the attention of the Excise to the anomaly thus created, when the authorities admitted the injustice; and having instituted inquiries, made various suggestions (as to modes of drawback, &c.,) with the view to remedy the difficulty; but no efficient means could be discovered to answer this end, and yet ensure to the Government sufficient security against fraud. I remain, Sir,

Yours most respectfully,
J. BETTRIDGE, JUN.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to

**which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.**

*A. Sub.*—**Legal questions cannot be answered in the Journal; but it may be stated, that the Paper and Collodion processes in Photography are unfettered by any patent rights, except the taking of portraits for gain. As to the Daguerreotype, although there are patents in existence, it is practically free.**

*List of Lecturers.*—**With reference to the circular relative to the formation of a General List of Lecturers recommended by Institutions, and to the Form which accompanied it, the Secretary has to ask, as a particular favour, that the Form may be filled in and returned immediately.**

### MEETINGS FOR THE ENSUING WEEK.

WED. Royal Botanic, 1.—Annual Meeting.
Architectural Assoc.—Conversazione.

## MISCELLANEA.

New York Crystal Palace.—The Exhibition of the Industry of all Nations was opened at New York, on Friday, the 15th of July, by the President of the United States, assisted by various diplomatic and official authorities. From 6,000 to 8,000 persons are said to have been present, and all the available points for obtaining a view of the ceremony were occupied. Lady Ellesmere and daughter, and Sir Charles Lyell and lady, were on the platform; as were also Mr. C. Wentworth Dilke, Mr. [illegible]. Whitworth, Professor Wilson, Mr. Augustus Belmont, United States Chargé to the Hague, and several Ministers, resident at Washington, for foreign countries. Lord Ellesmere was prevented attending the inauguration by a severe attack of gout. On the following day, the Directors of the Exhibition gave a complimentary banquet, at the Metropolitan Hotel, to the President of the United States, and the Commissioners from foreign nations, in attendance upon the Exhibition. The different specimens had not yet been arranged, and it was expected that the machinery court would not be in operation for two or three weeks, when the additional structure then in progress of erection would be completed. In the Statuary department, Thorwaldsen's group, representing our Saviour and the twelve Apostles, and Kiss's Amazon attracted general attention. The contributions from France had not arrived. The specimens contributed by the United States consisted principally of machinery, tools, and inventions of various kinds in the useful arts. Great Britain exhibits a large display of silver ware, as well as manufactured goods. The Zollverein and Germany have likewise contributed; and so also have Italy, Switzerland, Holland, and Austria. The latter country exhibits a very large collection of cutlery, manufactured at Vienna. The British possessions are said to be very fairly represented.

The Tobacco-pipe Trade.—It appears that this branch of trade is suffering from the excessive competition with the French fancy clay pipes. At one time the Dutch enjoyed a tolerable share of the pipe trade of this country, in consequence of their getting them neatly moulded. The British pipe makers, though possessing the best fields of clay for this purpose, are far behind both the French and the Dutch in the method of moulding fancy clay pipes. The effect of the competition has been, it would seem, to increase the number of the London tobacco-pipe manufacturers from three or four to about three or four hundred. The quantity of long pipes supposed to be made in London daily is a little above 1,000 gross; and if it is estimated that there are 350 men engaged in the work, this will give on an average, as the production of each man, about three gross per day. The price varies from 1s. to 1s. 6*d*. per gross. Several attempts have been made within the last few years to produce the ordinary clay pipes by machinery; and it is rather surprising that what would seem to be so simple a thing should not hitherto have been attended with success.

French Commercial Law.—The following decision was lately made by the Tribunal of Commerce for the Department of the Seine. It appears that a number of cafés had been established in the neighbourhood of the "Cirque Napoleon." The proprietor of this theatre being desirous of favouring one of the cafés, gave permission to Foubet, the landlord of it, to name his establishment the *Café du Cirque Napoléon.* Marchetti, the landlord of one of the neighbouring cafés persisted in calling his establishment by the same name, which he had previously adopted. Proceedings were then taken by Foubet against Marchetti to prevent the use of this name by him. Whilst these proceedings were pending, by some process known to the French law, Queranne and Commissaire, landlords of another café, interposed, and set up their right in the action to use the name, and claimed 5,000 francs damages. The court, after hearing all parties, and it appearing that the proprietor of the theatre was in no way concerned in Foubet's business, held that he had no power to authorize Foubet exclusively to use the name of his theatre, that the right to use the name was vested in the person first adopting it, and that neither Foubet nor Marchetti was entitled to its use, but that Queranne and Commissaire had the right, it being proved that they had been the first to use the name. No damages were awarded, as it did not appear that any had been sustained, but Foubet was condemned in all the costs.

Substitute for Bottle Corks.—M. Blain, a Frenchman, has invented a stopper for wine and other bottles, applicable also for jars, for anatomical preparations, preserved meats, and all other things requiring to be made air-tight. The stopper is made of glass, and is in shape like a mushroom, the stem being slightly smaller than the neck of the bottle or vessel. He takes a tube of vulcanized Indian-rubber about an inch long, and of such a size as when dilated it will fit closely to the exterior of the neck of the bottle, and inserts into one end of it the top of the stopper. It is then by means of a thread passing around the head, in a groove for that purpose, fixed securely in its place, the India-rubber tube standing like a chimney to the stopper. The bottle or vessel is then filled with the liquid, &c., to be preserved, and the stopper inserted. The India-rubber is then turned downwards, inside out, so as to cover the neck of the bottle, to which it is made fast by a string passing round it, under a projecting rim; the string being then brought to the top of the stopper, where it is sealed. It is said to be in extensive use, and to answer admirably.

Gas-lighting.—The town of Calcutta is about to be lit with gas. The Improvement Commissioners have issued notices requesting tenders for the whole of the works, on the understanding that they are to pay only a fixed price per mensem for each of a given number of lights.

Decimal Coinage.—The draft Report of the Committee of the House of Commons on this subject, has just been printed. From the evidence taken by the Committee, as to the effect of the changes of the coinage in the United States and Ireland, it is not apprehended that much difficulty or inconvenience will be experienced in making any change in the system here. In the United States, the old system of pounds, shillings, and pence, has been entirely superseded by the decimal system of dollars and cents; and in Ireland, the thirteen Irish pence, which formerly made an English shilling, has been substituted by twelve pence. The Committee are not of opinion that the difficulties arising from the necessity of a re-adjustment of a large number of existing contracts, and obligations based upon the present system, are in any way insuperable. They recommend that the present pound sterling should be retained as the basis or unit of the new decimal system, as being not only interwoven with all our ideas of value, but also because it is in itself admirably adapted for the purpose. Its tenth part already exists in the shape of the florin or two shilling piece; while an alteration of four per cent in the present farthing, will serve to convert it into the lowest step of the decimal scale, which it is necessary to represent by means of an actual coin, viz., the thousandth part of a pound, to which it appears to the Committee the name of mil should be attached, in order to mark its relation to the unit of value. The addition of a coin to be called a cent. of the value of ten mils, and equal to the hnndredth part of the pound, or the tenth part of the florin, would serve to complete the list of coins necessary to represent the moneys of account, which would accordingly be pounds, florins, (or dimes, as was proposed to the Committee, as expressing the relation of that coin to the pound) cents, and mils.

**Iron Sleepers.**—Messrs. Day and Laylee, of Ashford, have recently taken out a patent for semi-tubular wrought and cast iron transverse sleepers for railways. The sleepers are laid with their concave side downwards, and in those of wrought iron an opening is left at the centre, for the purpose of facilitating the perfect packing of the sleeper, for passing other rails for crossings, and also for convenience of drainage. In the cast iron sleeper this is accomplished by casting it in two pieces, and connecting them by means of wrought iron bars. Openings are left in the wrought iron sleeper to receive the rail seating, which is of cast iron in two pieces, a wooden key being used to tighten the rail in the usual manner. In the cast iron sleeper, the seating or chair and the sleeper are in one casting. It is said that to each 15 feet rail, the bearing surface of the sleepers will be 11¼ feet. It is presumed that by this plan the maintenance of the permanent way will cost less than one-half that of a line where ordinary wooden sleepers are used. The ready means of packing at the two ends, and from the central opening will, it is said, save labour; and the bearing surface of the sleeper being near the top of the ballast, a less thickness will suffice. The form of the sleeper, too, it is thought affords facility for a more perfect drainage than if it were solid; added to which the seating for the rail being 10 inches long, a greater bearing is obtained than with the ordinary chairs.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 28th July*, 1853.
787. Railways (India)—Return.
788. Queen Charlotte's Island—Correspondence.
800. Bills—Customs, &c., Duties.
812. ,, —Dublin Carriage (amended.)
Public General Acts, Cap. 35, 36, 37, 38, 39, and 40.

*Delivered on 29th July.*

792. Westbury-on-Severn Union—Returns.
810. Metropolitan Commission of Sewers—Return.
692. Indian Territories—Fourth Report from Committee.
816. Bill—Turnpike Acts Continuance (Ireland.)
Prisons of Ireland—Thirty-first Report of Inspectors General.

*Delivered on 30th July and 1st August.*

794. Drainage (Ireland)—Return.
824. Civil Services, Estimates, Class 8.
384 (1). Cockermouth Election—Index to Minutes of Evidence.
467 (1). Harwich Election— Ditto ditto.
822. Drainage (Ireland)—Return.
832. Metropolitan Commission of Sewers—Return.
843. Navy—Supplementary Estimate.
825. Bills—Sheriffs (Scotland.)
827. ,, —Hackney Carriage Duties (amended.)
829. ,, —Smoke Nuisance Abatement (Metropolis.)
830. ,, —Ecclesiastical Leasing Act Amendment.
828. ,, —Customs (amended.)
828 (a). ,, —Synopsis of Customs Bill.
844. ,, —Customs Acts Consolidation.
840. ,, —Assessed Taxes (amended.)
841. ,, —Missionary Bishops.
845. ,, —Insurance on Lives.
Convict Packets—Report.
Canterbury—Report of the Commissioners.
Convict Prisons—Lieut.-Col. Jebb's Report.

*Delivered on 2nd August.*

804. China—Return.
793. Foreign and Colonial Postage—Return.
819. Pilotage—Account.
821. Assessed Taxes (London)—Return.
846. New Houses of Parliament—Correspondence.
691. Accidents in Coal Mines—First Report from Committee.
831. Bills—Colonial Church Regulation.
842. ,, —Drainage of Lands (Ireland), amended.

*Delivered on 3rd August.*

395 (1). Sheriff Courts (Scotland)—Return.
742. Sheriffs, &c. (Scotland)—Accounts.
751. Plymouth Election Petition (Further Inquiry)—Minutes of Evidence.
853. Bill—South Sea and other Annuities, Provision for Payment, &c.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 29th July*, 1853.

*Dated 18th June*, 1853.

1485. G. Harrington—Producing railway and other tickets.
1487. J. F. D. de Bussac—Making with iodine, in combination with other substances, various elementary combinations. (A communication.)

*Dated 20th June.*

1512. J. Skertchly—Application of baths to articles used for resting the human body.

*Dated 23rd June.*

1531. P. A. le Comte de Fontainemoreau—A new distilling apparatus. (A communication.)

*Dated 29th June.*

1569. J. Imray—Motive power.

*Dated 4th July.*

1596. F. M. de Amezaga—Motive power.

*Dated 6th July.*

1611. W. W. Cook—Woven or textile fabrics.

*Dated 9th July.*

1634. J. and S. H. Parkes—Manufacturing mathematical instruments, and packing the same.

*Dated 11th July.*

1645. G. Ager—Holding and turning over leaves of music-books.
1649. H. B. Hopwood—Ships' ports or scuttles.

*Dated 12th July.*

1653. W. Levesley—Table-knife blades.
1655. J. H. Johnson—Preparation of glycerine. (A communication.)
1657. M. Samuelson—Bricks, &c.
1659. W. F. Snowden—Mangle.

*Dated 13th July.*

1661. H. M. Grover—Finding and indicating measurements of sines and cosines, &c.
1663. T. H. Bakewell—Ventilating mines.
1664. W. Williams—Electric telegraph.
1665. J. L Tabberner—Manufacture of iron.
1666. F. Ransome—Artificial stone.
1668. A. Fryer—Apparatus for reburning animal charcoal.

*Dated 14th July.*

1669. W. Needham and J. Kite—Machinery for pressing moisture from bodies.
1671. A. Carosio—Electro-magnetic apparatus.
1673. R. A. Brooman—Manufacture of anvils. (A communication.)
1675. G. Humphery—Regulating supply of water to water-closets.
1676. R. S. Bartlett—Manufacture of sewing-machine needles.
1677. J. Yule—Rotatory engines.
1678. W. Little—Manufacture of lubricating matters.
1679. B. Looker—Manufacture of bricks.

*Dated 15th July.*

1680. J. Nasmyth—Machinery for rolling plates and bars of iron, &c.
1681. G. Gowland—Nautical and surveying instruments.
1682. R. Gordon—Furnaces for consuming smoke.
1683. H. J. D'Huart—Pottery.
1685. C. Liddell—Moving boats on canals and rivers.
1686. H. Nathan and S. Elsner—Spectacle and reading-glasses.
1687. H. Bessemer—Refining sugar.
1688. C. Goodyear—Spreading or applying India-rubber on fabrics.
1689. H. Bessemer—Treatment of bastard sugars, &c.
1690. C. Goodyear—Manufacture of brushes, &c.
1691. H. Bessemer—Refining sugar.
1692. J. Taylor—Machinery for printing.
1693. C. Goodyear—Manufacture of pens, pencils, &c.
1694. C. Goodyear—Preparing india-rubber.
1695. C. Goodyear—Beds, seats, &c., to contain air.
1696. J. B. Jelie—Machinery for dressing thread.

*Dated 16th July.*

1698. E. R. Fayerman—Keeping time in music.
1699. H. Lamplough—Effervescing beverages.
1700. J. Rives—Hernia trusses.
1701. B. Burrows—Jacquard apparatus.
1702. J. Naylor—Lamps.
1703. S. Colt—Machinery for boring metals. (Partly a communication.)
1704. M. G. A. E. le Coat de Kervéguen—Wheel for motive power and propelling.
1705. J. W. Duncan—Adhesive soles and heels for boots, and apparatus for same.

*Dated 18th July.*

1706. J. Alexandre—Metallic pens and holders.
1707. W. Boggett—Knife-cleaning machines.
1709. T. Wood and G. Wade—Carding machinery.

*Dated 19th July.*

1712. P. A. le Comte de Fontainemoreau—Fastening buttons, and improved button and machinery for same. (A communication.)
1713. R. Dart and E. Silverwood—Loom machine for embroidery for badges, &c., requiring a succession of figures.
1714. C. Breese—Forming designs on papier maché, &c.

*Dated 20th July.*

1715. J. Robison—Apparatus for making tea, coffee, and other decoctions.
1717. E. D. Smith—Crushing and washing ores.
1718. J. S. Norton and H. J. Borie—Tiles and stairs of plastic materials.
1719. J. D. Goodman—Lanterns.
1720. P. P. de St. Charles—Stopping and starting vehicles.
1721. A. Cochran—Finishing muslins.
1722. J. Mills—Propelling carriages.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 28th July*, 1853.

214. Louis Christian Koeffler, of Rochdale—Improvements in bleaching and dyeing.
221. Richard Archibald Brooman, of 166, Fleet-street—Improvements in cables. (A communication.)

*Sealed 29th July.*

223. Henry Avins and George Tarplee, of Birmingham—Invention of a new or improved brick.
224. John Standish, of Bolton—Improvements in machinery or apparatus used in the preparation of cotton, wool, flax, or other fibrous materials to be spun.
230. John Ryall Corry and James Barrett Corry, of Queen Camel, Somerset—Invention of a new or improved method of dressing lambskin leather, and cleaning the wool therefrom.
241. Jean Baptiste Lavanchy, of Tannige, Savoy—Improvements in the construction of collapsible framework of wood or iron, which may be employed for forming portable bedsteads, houses, parts of houses or bridges, and other similar structures, which may occasionally be required to be removed from place to place with facility, economy, and despatch.
287. Ismael Isaac Abadie and Henri Lauret, of Paris—Invention of a new or improved manufacture of parasols.
331. William Scott, Robert Brough, and James Rinoe, of Brighton, and Thomas Mann, of Stroud, Rochester—Improvements in steam-engines.
746. Samuel Newton, of Stockport, Chester—Invention of a self-acting friction-break, to be applied to engines, carriages, and wagons used on railways.
935. William Fawcett and Francis Best Fawcett, of Kidderminster—Improvements in the manufacture of carpets.
1059. Edwin Heywood, of Glusburn, near Keighley, Yorkshire—Improvements in apparatus for actuating and regulating the throttle-valves of steam-engines.
1080. Frederick Arnold, of Park-road, Barnsbury—Improvements in binding or covering books.
1218. Samuel Eccles and James Eccles, of Kensington, Philadelphia—Improvements in power-looms for weaving figured fabrics.
1280. James Lovell, of Glasgow—Improvements in heating and ventilating.
1317. François Francillon, of Puteaux, France—Improvements in dyeing and printing silk, wool, and other animal fibres.
1338. William Edward Newton, of 66, Chancery-lane—Invention of an improved construction of hand-stamp. (A communication.)
1339. Joseph Morris, of Ashwood Bank, near Redditch—Improvements in the manufacture of envelopes for needles.

*Sealed 30th July.*

244. Thomas Knox, of Birmingham—Invention of a new or improved rotatory heel for boots and shoes.
247. Samuel Perks, of 1, Walbrook—Improvements in the mode of constructing certain works applicable to aqueducts, viaducts, railways, canals, rivers, docks, harbours, lighthouses, breakwaters, reservoirs, tunnels, sea-walls, embankments, submarine foundations and other useful purposes.
248. Richard Palmer, of Bideford—Invention which may be used for cutting turnips, mangold wurtzel, carrots, and other roots, or for bruising them only, or reducing them to a pulp, and for mixing them with meal, as may be required, and also for grinding or crushing apples for cider.
259. William Pizzie, of Albourn, Wilts—Invention of a railway-carriage break.
260. Marc Louis Adam Tarin, of Mount-street, Grosvenor-square—Invention of an improved dust-pan.
261. Marc Louis Adam Tarin, of Mount-street, Grosvenor-square—Improvements in reflectors for diffusing light
262. James Comins, of South Moulton, Devon—Invention of a clod-crusher, land-presser, or pulverizer.
264. Charles Cattanach, of Aberdeen—Invention of a certain apparatus for measuring the human figure, and transferring the said measurement to cloth.
265. John Pinkerton, of High-street, Borough—Invention of a new mode of applying and combining ornamental glass in the manufacture of useful and ornamental articles.
267. Charles Hadley, of Lower Hart-street, Birmingham—Improvements in the construction and formation of granite and stone pavements and surfaces for carriages and railways.
269. Eliezer Edwards, of Birmingham—Invention of a new or improved bedstead, which may be used as a vehicle.
1119. George William Jacob, of Dalston—Invention of an improved manufacture of metallic covers or seals for bottles, jars, and other like vessels, and in applying or affixing them.

*Sealed 2nd August.*

281. Auguste Edouard Loradoux Bellford, of 16, Castle-street, Holborn—Improvements in life-boats and vessels of a similar nature. (A communication.)
295. John Bower, of Dublin—Improvements in and applicable to certain descriptions of engines for driving piles.
317. Thomas Peacock, of Ashton-under-Lyne—Improvements in weaving, and in machinery for weaving hat-plush and other cut piled fabrics.
334. Richard Archibald Brooman, of 166, Fleet-street—Improvements in sail-hanks, for securing stay-sail jibs and other sails to their proper stays. (A communication.)
338. Thomas Allan, of Adelphi-terrace—Improvements in protecting telegraph wires.
339. Thomas Allan, of Adelphi-terrace—Improvements in galvanic batteries.
345. William Birkett, of Manningham Mills, Bradford, Yorkshire—Improvements in treating soap-suds or wash waters in which soap has been used.
408. Charles Shepherd, of Maestig Iron-works, near Bridgend—Invention of an improved stove and apparatus for heating air for blast purposes.
471. James Lawrence, of Colnbrook—Improvements in the drying or preparation of malt, meal, seeds, corn, and other grain.
473. Francis Preston, of Manchester—Improvements in the manufacture of certain parts of machinery to be used in preparing and spinning cotton or other fibrous materials.
500. Martyn John Roberts, of Woodbank, Gerrard's Cross, Bucks—Improvements in the manufacture of mordants or dyeing materials, which are in part applicable to the manufacture of a polishing powder.
1211. Moreton Hassall Phillips, of Shrewsbury—Invention of an improved gun.
1331. John Champney Bothams, of Vine-cottage, Londonderry-road, Camberwell-green—Improvements in steam-engines.
1347. Admiral the Earl of Dundonald, of Belgrave-road—Improvements in apparatus for laying pipes in the earth, and in the juncture of such pipes.
1391. Christopher Nickels, of Albany-road, Camberwell, and James Hobson, of Leicester—Improvements in weaving.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| July 28 | 3496 | Safety Roller Carriage Handle | John Purdy<br>and<br>John Young | 1, Richard-street, Commercial-road East.<br>3, Spencer-street, St. George's-in-the-East. |
| ,, ,, | 3497 | Cygnet Hook | Capt. Augustus Collinridge | South-street, Thurloe-square, Brompton. |

# SOCIETY OF ARTS.

**FRIDAY, AUGUST 12th, 1853.**

## FRENCH PATENTS.

Never since the passing of the law in 1791 have there been so many Patents for Inventions taken out in France as during the last eighteen months. It is interesting to watch the progress of this movement; the number of patented discoveries being in some sort a measure of the activity of intellect in the Industrial Arts. The number decreases in times of doubt and hazard, whilst in periods of tranquillity it increases. No one will take the trouble, or put himself to expense, to make researches to bring into practice new ideas, if the position of the country does not afford him a rational hope of fair remuneration for his labours. Looking back previous to the year 1848, the number of applications for patents appears to have reached 2,930 in 1846, and 2,925 in 1847. In the last year (1852), the number had risen to 3,352. Since the 1st of January, 1853, a further and more rapid progress is developed. The number of patents taken out in the half year just past is 1,982, whilst in the corresponding six months of the previous year it was only 1,506. If the same rate of increase is maintained during the current half year, over the number of the corresponding half of last year, as there is every reason to believe, the total number for 1853 will be not less than 4,500. It is curious to observe the relation between the political state of the country and the march of invention. For the facts, let us look at the results of the year 1848. In that year of revolution and disturbance, instead of 2,925 in 1847, there was only 1,220; included in which it must be remembered that 327 belonged to the two first months of that year, leaving in fact for the ten months only 893, or an average of 89 per month; whilst the monthly average for 1847 was 243. The separate statistics for each month of 1848 are still more significant. In the month of March, whilst there existed great hope for the future in the changes which were taking place, there were 117 patents taken out. In April, however, there were but 57. In May, the arbitrary power assumed by the National Assembly put an end to the hopes its establishment had raised, and the industrial world fell into complete disorder, and 47 patents only were applied for. The number still further decreased in July, the effect of the disastrous days which marked the close of June. With the dawn of better days, however, they then gradually increased to the end of the year, with some trifling fluctuations, in October, 110; in November, 130. In the month of December, in spite of the great appeal then made to the electors, the number rose to 155. It was then the Provisional Government ceased, and there was something like a guarantee for order for the future. Notwithstanding this, the monthly average for that half year did not exceed 103; whilst in the corresponding half year of 1849 it reached 180, increasing without a drawback to 279 in 1852. The entire year of 1849 gave a total of 2,022 patents, or 802 more than that of the preceding year. The numbers are 2,239 in 1850, and 2,530 in 1851, ending with the enormous increase before-mentioned for 1852 and the current year.

It appears that the Department of the Seine is most prolific in patents, that department claiming in 1851, 1,715 out of the total 2,530; and in 1852, 2,266 out of 3,352. For the first six months of this year (1853), 1,363, out of a total of 1,982 belong to the Seine. The next in point of number is the Department of the Rhone, with its noble silk factories. With respect to the Seine, no doubt the large number may be accounted for in some respects by the fact, that individuals are attracted to the metropolis as the centre of science and knowledge; and that before their return, they take out their patent there.

The classification of the patents for 1851 and 1852 amounting in all, after making deduction for "certificates of addition," to 4,323, is as follows:

| | |
|---|---|
| Machines and apparatus of all kinds .... | 1,395 |
| Chemical arts ........................ | 820 |
| * "Industries Parisiennes" ............ | 768 |
| Philosophical instruments............ | 489 |
| Metals, minerals, stones, &c. .......... | 285 |
| Fine arts ............................ | 195 |
| Agriculture ......................... | 116 |
| Ceramic arts......................... | 85 |
| Textile manufactures ................ | 170 |
| Total ........ | 4,323 |

The enormous increase in the number of patents indicates great activity in the industry of France, and augurs well for the display of 1855.

## TABLE,

showing the amount of business in the United States' Patent Office for the eleven years ending with 1851, taken from the Report of the Commissioner of Patents for the year 1851.

| Years. | Applications filed. | Caveats filed. | Patents issued. | Cash received. | Cash expended. |
|---|---|---|---|---|---|
| | | | | Dollars. | Dollars. |
| 1841 | 847 | 312 | 495 | 40,413 01 | 23,065 87 |
| 1842 | 761 | 291 | 517 | 36,505 68 | 31,241 48 |
| 1843 | 810 | 315 | 531 | 35,315 81 | 3[illegible],776 96 |
| 1844 | 1045 | 380 | 502 | 42,509 26 | 36,344 73 |
| 1845 | 1246 | 452 | 502 | 51,076 14 | 39,395 65 |
| 1846 | 1272 | 448 | 619 | 50,264 16 | 46,158 71 |
| 1847 | 1531 | 533 | 572 | 63,111 19 | 41,878 35 |
| 1848 | 1628 | 607 | 660 | 67,576 69 | 58,905 84 |
| 1849 | 1955 | 595 | 1076 | 80,752 78 | 77,716 44 |
| 1850 | 2193 | 602 | 995 | 86,927 05 | 80,100 95 |
| 1851 | 2258 | 760 | 869 | 95,738 61 | 86,916 93 |

## TUBULAR PIPE DRAINS *versus* BRICK SEWERS.

In consequence of the prevalence of fever at Croydon, at the end of 1852, and the commencement of the present year, where, in a population of about 16,000 persons, about 1,800 cases of fever occurred, with a mortality of about sixty, and very numerous cases of diarrhœa and dysentery, with a mortality of about ten; and to its alleged connection with the works of sewerage and water supply recently executed in that place,—Viscount Palmerston, M.P., Her Majesty's Principal Secretary of

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* By this phrase is understood toys, children's games, articles for travelling, sporting, fishing, encamping, hats and caps, artificial flowers, stays, umbrellas, parasols, bed-furniture, brushes, gloves, paper, stationery, &c.

State for the Home Department, directed an inquiry to be instituted by Dr. Neil Arnott and Mr. Thomas Page, C.E., the results of which have just been presented to both Houses of Parliament by Her Majesty's command. In the general Report signed by both these gentlemen, which prefaces the individual Reports as to the medical and engineering parts of the inquiry, it is stated that "the result of our investigations is a conviction that the operations of the plan for the sewerage have been influential in producing the disease." As large sums of money are being expended in all parts of the country in improving the sanitary condition of towns, and as the system adopted at Croydon, and recommended by the General Board of Health, namely, the substitution of pottery pipes for brick sewers, has had a complete trial at that place, which is said to be favourably situated for this system, it is considered that it will be advantageous to give some account of the works there, of the reasons of their failure, and of the comparative merits of tubular pipe drains in place of brick sewers. For this purpose, Mr. Page's elaborate Report will be largely drawn upon.

It appears that early in 1849 Mr. Ranger, one of the Superintending Inspectors of the General Board of Health, was employed to survey and report on the state of Croydon. "He recommended sewerage by stoneware tubes, the greater part of which he anticipated, from the favourable position of the streets, would not exceed eight inches in diameter. He also suggested the application of back drainage for the houses, in preference to sewers laid along the streets; and recommended as sources for water supply, the river and springs of the Wandle." In August, 1849, a Local Board of Health was appointed, and Mr. George Donaldson, one of the Engineers of the Metropolitan Commissioners of Sewers, was engaged to lay down a plan for drainage and water supply; and he, in conjunction with Mr. Cox, the Board's Local Surveyor, also prepared the requisite plans and estimates. These were submitted to the General Board of Health, as required by the Act, and by it referred to Mr. Ranger, who made certain alterations in the plan of the works, which was then passed by the General Board, who stipulated, however, that no outlay should be incurred without a previous certificate from their Superintending Engineer, Mr. Ranger, who somewhere about this time, it would seem, became also Engineer to the Local Board.* The chief alterations in the plan of the works were the reduction of the sizes of the pipe-sewers from six inches to four inches, and from eight and nine inches to six inches, and in the manner of disposing of the sullage, which Mr. Donaldson proposed should be used for irrigation and agricultural purposes, and which, in place thereof, was conducted to a building called the "filter-house." The supply of water and the provision for the drainage appears to have been completed in December, 1851.

Mr. Page in his Report gives the following "features of the works, which the evidence shows are especially open to objection:

"1st. In obstructions in the main sewers and house drains, consequent reflow of sullage into the houses, and all the nuisance and tendency to disease resulting from it, and the annoyance of back drainage.

"2nd. Absence of provision for ventilation, and consequent escape of noxious gases into the houses, and their deleterious effects.

"3rd. The establishment of the screening process at the filter house, so close to the town as to create a nuisance by the escape of effluvia from it, and from the soil removed from it.

"4th. Pollution of the Wandle, by the discharge of fæcal matter into it.

"5th. Nuisance caused by the irrigation of meadows by the liquid sullage.

"6th. The want of sufficient land drainage."

In reference to the first feature, "Mr. Cox returned 51 stoppages in the public sewers; viz., 27 in the sewers of 4 inches in diameter; 20 in the sewers of 6 inches in diameter; 1 in the 12-inch sewers; 1 in the 15-inch sewers, and 2 in the 18-inch sewers. The other witnesses, many of whose house drains had been filled by stoppages in the sewers, consider that in many cases the pipes were too small; that they were laid too level; and that too many bends were made in them, in order to bring them to the backs of the houses. * * *

"One of the causes of the numerous stoppages, and a source of annoyance to the inhabitants, both in the first operations and in the working of the plan, was the system of forming the sewers at the back of the houses, called back drainage, by which the soil from several houses is passed into the same branch drain, a stoppage in which affects all the houses above the point of the obstruction. Whatever advantages there may be in avoiding interruptions in the public streets, caused by breaking them up for examinations of pipes, or to remedy the now rare occurrence of faulty execution in brick sewers, it is certain that for one family to be subjected to annoyance by the neglect of another, * * * must far more than counterbalance such advantages. * * * Practically speaking, if each house have a direct communication with the main sewer, and that main sewer be large enough to carry away all the matter discharged into it, and be well ventilated, no nuisance can occur but from imperfections in the house drains themselves, and the domestic appurtenances attached to them. And for the house drains, the pipes are excellent, when the joints can be made and maintained perfect. But this system is the very reverse of the back drainage."

In regard to the fractures and thickness of the pipes, "it appeared that in three instances the 18-inch pipes had been broken—in two cases to the extent of 10 yards, in another 30 yards, in every case at depths of from 10 to 12 feet, in gravel and clay. In the first instance the broken pipes were replaced by new ones, in the last by brickwork. In another instance, about 5 yards of 15-inch pipe were broken in 20 feet depth of sand or clay; another fracture of 15-inch pipe occurred, but the length is undermined; and in the last-mentioned, the two 12-inch pipes leading to the outfall in Waterman's Meadow, which were broken to the extent of 100 yards in 11 feet depth of clay, have been repaired, partly by pipes of greater thickness, and partly by pipes protected from the pressure of the earth by slabs of timber supported on brick piers."

In reference to the second feature—the absence of ventilation in the pipe sewers—it is stated, that supposing "an obstruction to occur in a line of branch pipes or mains, the passage to the outfall being barred, and the generation of the gases going on, they soon exert a pressure sufficient to overcome the pressure of water in the syphon trap, and escape by the closets and sinks, where there is least resistance."

Of the third feature, it is said, that "this screening process is also based on a miscalculation; for it is evident that the solids which are caught are but a tithe of the original, which, passing along a line of pipes, jostled by the scrubbing-brushes and hearth-stones, and other matters partaking of this water-carriage, become mixed with the water before reaching their destination, and are discharged into the river in the form best adapted to poison the water."

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* A document has just been printed by order of the House of Lords, showing that the Inspectors under the Public Health Act have been employed in twenty-three places as Engineers in carrying out the works, a system which seems scarcely to admit of an efficient Inspectorship as required by the Act.

In regard to the sixth feature, it is stated that "it is of greater consequence to provide for this where sewerage is effected by impermeable pipes, for if these are perfectly joined, the land water cannot enter; if imperfectly, the sullage can escape. Without other means of land drainage, therefore, they are only fit for draining a town built on a rock. Brick sewers have this advantage, they drain the land wherever they are constructed, they can be made impermeable at the invert where the sullage runs, and permeable in the arch which the sullage does not reach."

Mr. Page then makes some remarks on sewerage by pipes and brick sewers, refers to the size of pipes in various places, and says:

"In drawing your Lordship's attention to the operations of the plan for sewerage at Croydon, it is requisite to premise that in the system of draining towns, under the sanction of the General Board of Health, the use of brick sewers has been abandoned, and earthenware pipes have been substituted, not only for house drains and branch sewers, but for the main sewers themselves. The advocates of the pipe system, and those of the brick sewer system, have each strong opinions upon the advantages of their own system and the disadvantage of the opposite; the arguments of the former resting on the economy in the first cost of the pipes, their self-cleansing capabilities, the consequent avoidance of all decomposition, the rapid transmission by them to the outfall of all substances which will float in water, their eligibility as the 'cheapest means of carrying away the offal, garbage, and rubbish of slaughter-houses, markets, shambles, stables, cow-houses, or manufactories; and also all dirt and filth from the surface of streets, foot pavements, roads, yards, or open spaces by means of jets of water.'* As to the economy of the pipe sewers, it is stated that the saving of cost by the use of them admits of many towns being thoroughly drained, which could not bear the expense of brick sewers; and an illustration is given in the case of Rugby, the sewerage of which, by pipes varying from six inches to twenty inches in diameter, has cost less than 3,600*l.*, but which, by the old system of 'brick sewers of deposit,' would have been 15,000*l.*; and it is stated, that even 'supposing the brick sewers were durable, and pipe sewers not durable, the whole of the pipe sewers laid at Rugby could be pulled up, and renewed every four years, at less expense than the cost and maintenance of the brick sewers.' The advocates of the brick sewers admit an increase in the original cost of the sewers over the small pipes, when the sewers are large enough to admit of internal examination by labourers; but this increase does not apply when the pipes are large; they prefer the brick sewers to the pipes for main sewers, as securing the public from the annoyance of frequent openings, which stoppages in the pipes have occasioned, as affording easy access to the entrance of the house-drains, and preventing the escape of noxious gases into the houses, and of reflow of tide and flood waters in low districts—as being also available for subsoil and surface drainage, whereas the pipe system requires separate drains for the former, and altogether as being better calculated for the convenience of the public than the pipe system, and eventually as economical,—they deny the self-cleansing capabilities of the pipes, and refer to many disadvantages, such as breakages, expenses of examination, and replacement, to which this system is subject. The value of the pipes for house-drains and for small branch sewers they do not appear to question."

With the view of arriving at a correct opinion as to the practical working of the pipe system, other sources of information were referred to. From the recent examinations of the pipe sewers at Richmond, Manchester, Leeds, and in London, made by Mr. Bazalgette,* the chief engineer to the Metropolitan Commissioners of Sewers, it appeared that at Richmond, "between October, 1851, and December 11th, 1852, twenty-two cases of cleansings and repairs had been required. Examinations were then made in eleven places indiscriminately, at depths of from 8 feet to 17 feet, to ascertain the state of the pipe sewers, and of these the pipes in five cases were found broken, and in six cases sound. These results were with pipes of good quality, well laid, and with favourable inclinations." At Manchester, "the drains for single houses, originally 6 inches, having been frequently stopped up; pipes 8 inches, 6 inches were substituted, and none of a smaller size are now used for house drains." And again, "Not more than 100 houses are drained into a branch-pipe sewer 16 inches by 12 inches, and not exceeding 600 feet in length." At Salford, "the surveyor prefers those sewers which can be entered and cleansed, as being the most convenient, and eventually the most economical." With reference to Leeds, Mr. Bazalgette observes, that "6-inch pipes are used for a single house, and pipes from 20 inches by 15 inches, up to 24 inches by 18 inches, are used for paved courts; and that the Leeds Town Council, after a very careful inquiry at various places, have adopted the egg-shaped pipes, with socket joints." In London an examination as to the state of the pipe sewers showed, that out of 122 cases—69 on the north side of the Thames, and 53 on the south—"there were 113 in which the pipes contained deposit, which in 66 varied from 2½ inches to 7 inches in depth; 47 containing less than 2½; and the remainder were entirely choked. In 23 cases the pipes were found broken or cracked." The Metropolitan Commissioners of Sewers have therefore resolved to "abandon the back system of draining through private property, and decide that the sewers shall be laid down in the public thoroughfares; that all main lines of sewers shall be built in whole brickwork, the internal dimensions being not less than 3 feet 9 inches by 2 feet 6 inches; and that pipe sewers shall not be laid down in lengths exceeding 500 feet; and that then the smallest sewer pipe shall not be less than 9 inches internal diameter, nor more than 12 inches; each house to have a separate drain 6 inches in diameter."

Mr. Haywood, the Surveyor to the Commissioners of Sewers in the City of London, has also arrived at the conclusion, "that pipes should not be used for the main sewers of towns; and that the larger the town and the greater the traffic, the stronger is the objection to their use, as the re-opening of pavements and ground for examination, reparation, or cleansing of sewers, should be avoided by all practical means. He also recommends provision for the thorough ventilation of all sewers, whether brick or pipe."

It should be stated that Mr. Pilbrow, the Surveyor to the Local Board of Health at Tottenham, has, by paying "particular attention to the formation of the pipe-sewers, both as to quality of pipes, regularity of inclinations, carefully bedding them, flushing with abundance of water at various points in the lengths, preventing the ingress of surface-grit, &c.," succeeded in keeping them clear.

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* See Minutes of Information, &c.

* Vide Return to the House of Commons (668), being "Copy of the Reports of Mr. Bazalgette to the Metropolitan Commissioners of Sewers, relating to the Application, State, and Examination of Tubular-pipe Drains or Sewers."

Mr. Page, in his conclusions on the merits of the plan adopted at Croydon, says that "it must be accounted a *mistake*, not in using pipe sewers, but in using them to an extreme in length and in diameter, and of insufficient strength—in not providing openings for examination at frequent intervals—in neglecting any means of ventilation—in interfering objectionably with private property and domestic comfort, by adopting the system of back drainage—in not arranging the inclinations with regular gradations, and in avoiding brick sewers where these of the would have been advantageous. In the disp- its ultimate sullage, which ought to have been based establishing a disutility, the plan is objectionable on of the solids near gusting process for the sep a nuisance—in discharging enough to the town to ver, which all other operations of the sullage into th calculated to free from impurity—in the plan irrigation by sullage water too near the establi, and in not providing sufficient land drainage."

## ON COMMON SALT — THE SOURCES FROM WHENCE OBTAINED, AND THE PROCESSES INVOLVED IN ITS MANUFACTURE. WITH OBSERVATIONS ON THE ORIGIN OF SALT AND OTHER SALINE BODIES.

[*Continued from page* 461.]

BY W. BOLLAERT, F.R.G.S.

### ASIA.

**Turkey in Asia.**—Rock salt is found in abundance in Anatolia, where there are also springs and lakes which yield salt. That of Tuziah is 100 miles in circumference, and so saline and bitter that no fish can live in it. In Karamania rock-salt is so plentiful that it is used as a building material. At Kiz large quantities of nitre are extracted from the soil. Four days' journey from Aleppo is the Valley of Salt; in winter it has a saline lake; in summer salt is met with half an inch thick.

**The Dead Sea.**—This most interesting salt lake, according to Capt. Lynch, is forty-five miles long, by ten broad, and 1316 feet below the Mediterranean. He calls its waters a nauseous compound of bitter salts. The salt of the Dead Sea is greasy, from the presence of bitumen: the mountains around it are sharp and incinerated. Salt and ashes, mingled with sand and fetid sulphurous springs, trickle down the ravines. The bottom of the sea consists of blue mud and sand, and cubic crystals of salt. The most recent analysis of the water of the Dead Sea is by Messrs. Booth and Muckle, S. G. at 60°=1.22742, taken to the United States by Captain Lynch:

| | |
|---|---|
| Chloride of magnesium | 145·8971 |
| ,, calcium | 31·0746 |
| ,, sodium | 78·5537 |
| ,, potassium | 6·5860 |
| Bromide of potassium | 1·3741 |
| Sulphate of Lime | 0·7012 |
| | 264·1867 |
| Water | 735·8133 |
| | 1000·0000 |

The south shore is described as a scene of utter desolation; on one side, rugged and worn, are the rock-salt mountains of Usdum. Hitchcock, in his Geology, says, "At Usdum the wells of asphaltum have been set on fire by volcanic action; volumes of steam, smoke, and suffocating vapours, have been set at liberty; perhaps, too, the remarkable ridge of rock salt called Usdum has been produced." M. de Saulcy describes the plains as burnt arid deserts; the rocks are calcined, and appear as if thrown out by volcanoes: indeed, many craters of extinct volcanoes were met with, and there are considerable flows of lava. Alluding to the salt mountains of Usdum, he observes, "One upheaval might have caused the rising of this mass of salt, which is three leagues long, one league wide, and more than 100 metres high; such an upheaval must have been caused by a volcanic eruption, which destroyed simultaneously the cities of the plain: each of the ruined cities is at the base of a crater, and all these volcanoes are geologically recent." The Dead Sea appears to have no outlet, but gets rid of its waters, received by the Jordan and other streams, by solar evaporation. Nitre was found by Robinson, scattered along the base of the salt mountains; he ascertained that it was used by the Arabs for making gunpowder.

**Arabia.**—Salt is so plentiful in some parts as to be used for building. Muscat exports much bay salt from its coasts.

**Persia** is probably more abundantly supplied with salt than any country in the world. It covers large tracks; the lakes, some of which are very extensive, are salt; and nearly every collection of water is impregnated with it. At Shiraz salt is obtained from adjacent lakes, which are said to be of volcanic origin. The barren island of Ormuz is almost wholly composed of salt. Much sulphate of soda is said to be met with on the eastern shores. The salt lake of Oromiah is 300 miles in circumference; the waters hold one-fifth of their weight of saline materials, and contain much sulphuretted hydrogen. Five hundred parts of the water gave—

| | |
|---|---|
| Salt | 90·58 |
| Chloride of magnesium | 5·76 |
| Chloride of calcium | 0·74 |
| Sulphate of soda | 5·76 |
| Bromine | traces |
| | 102·84 |

**Cabul.**—Here is the extensive group known as the "Salt Range." Burns describes the salt here as being mixed with magnesia. In 1822, 80,000,000 lbs. were raised, and sold at the mines at 2*s.* per 50 lbs.; but the price was subsequently doubled. Dr. Fleming, who has very recently explored this district, believes that the saliferous masses have been produced by eruptive agencies. The rock salt is found in a gypceous red marl. The Punjaub salt range yielded the Government in 1851 14,000*l.* annually. Rock salt exists at Kotree, in Scinde, which could be delivered near Bombay for 5*s.* per ton; but the average price paid by the Company in 1847 was nearly 2*l.* 5*s.* To the north-east of Kotree is Lake Samber, from whence a considerable portion of Upper Hindostan is supplied with salt.

**Hindostan.**—The Runn is an extensive salt morass, communicating with the Gulf of Cutch, and in some places covered for miles with a salt incrustation; the water courses leading into the Runn are impregnated with salt. Here we have an instance of the saline matters of the ocean mixing with those of the land, and probably forming large collections of salt. British India is badly supplied with salt, in consequence of the monopoly of it by the East India Company. Bay salt, badly made, is prepared on the coast. An impure kind is imported from the Persian Gulf, and some very impure is obtained, by washing the earth, in the interior. Mr.

Aylwin, in his work on the salt monopoly in India, says, "The revolutions of Bengal in 1756 and 1765, the capture of Calcutta, with the miseries of the Black-hole, &c., were connected with iniquitous practices of monopoly." In November, 1852, when Liverpool common salt was selling, at the works in Cheshire, at 4*s*. 6*d*. per ton, a calculation was made which showed that, with the Indian duty of 2 rupees 8 anas per maund, the selling price in Calcutta was about 1¾*d*. per pound! In the petition from Bristol against the excessive salt duty in India, it is stated that the cost of salt to the East India Company is ¼*d*. per pound, the Company's profit ¾*d*., and many of the native dealers sell it at 2¼*d*., or 21*l*. per ton! The cost of English salt does not exceed one-sixth of that manufactured in India.*

ASSAM.—Rock salt is found in the country of the Dolpos.

NEPAUL produces salt and nitre.

BAHAR.—Much nitre is washed out of the soil; that of Tirhoot gives about 8 per cent. Carbonate of soda is found in abundance at Hebipore, and on the edge of the plains inundated by the Ganges.

CASHMERE.—In the table-land of Ladakh, 9,000 feet above the sea, there are many salt lakes.

CEYLON produces bay salt by natural evaporation. Dolomite is found in the interior. It is in this rock the saltpetre caves occur.

BIRMA.—Bay salt is made on the coasts. Salt, nitre, and natron, are found in the arid calcareous tracks in the interior.

JAVA contains some remarkable volcanoes, which throw out salt mud, from which salt is prepared. It is from such natural operation we must probably look for some explanation of the formation of the orbicular species of rock salt, found in Cheshire and elsewhere.

AUSTRALASIA—SUMATRA.—Bay salt is prepared on the coasts, and saltpetre is extracted from caves.

LUZON.—Rock salt is said to be met with there.

In JAVA much bay salt is manufactured and exported. About 35,000 tons are annually consumed in Java.

NEW HOLLAND.—Some bay salt is prepared at Sydney, but the main supply is from England. Melbourne also receives salt from England. In South Australia much salt is said to be collected in lakes. In Adelaide, in September, 1852, fine Liverpool salt was selling at 6*l*. per ton, the duty being 3*s*. per ton. Western Australia abounds in salt lakes and coal.

In the SANDWICH ISLANDS salt is procured from a lake in the Island of Ohau, and exported.

The GALAPAGOS are volcanic islands, and at the bottom of some of the craters are strong salt lakes.

TARTARY.—Much of this extensive country is covered with saline plains, yielding salt and nitre. The Dobsoon Noor, or Salt Lake, celebrated all over the west of Mongolia, furnishes salt not only to the Tartars, but to the Chinese. Muriate of ammonia is obtained from two volcanoes, one called Torfan, the other the White Mountain. It is collected by the Calmucs, and distributed through Asia.

THIBET.—Kou-kou-noor, or the Blue Lake, is 400 miles in circumference; its waters are bitter and salt. During the very severe cold weather, these waters are covered with a solid crust of ice. In the arid country of the Tsaidam Mongols, salt and borax abound. The lake from which the borax (Tincal) and salt is obtained is fifteen days' journey from Teshoo-Lombroo; it receives no rivulets, but is fed by brackish springs, rising from the bottom of the lake. The borax is found crystallized in the lake, and though collected for a considerable time, has no appearance of diminishing. This locality is the great natural manufactory of borax, as Tuscany is of boracic acid, and as Peru (Province of Tarapaca) is for the newly discovered borate of lime. Rock salt is stated to be found in Thibet. On the surface of the dry elevated regions the production of nitre is abundant and spontaneous. There are high ridges, with volcanoes; saline, calcareous, and sulphur springs occur.

CHINA.—On the borders near Thibet are salt wells, with the addition of inflammable gas; so that Nature not only furnishes the brine, but also the fuel for evaporating the water, and extracting the salt. These wells yield a fourth or a fifth of salt. Bay salt is made in the harbour of Pekin.

## AFRICA.

MOROCCO.—The rock salt mines of the interior yield a considerable quantity, and the lakes of Barbary are saline; during summer many dry up, leaving salt encrusted in their beds. Bay salt is produced naturally on its coasts.

ALGIERS.—Near Lake Maris there is a mountain of salt, and many of the chains that traverse the country contain stores of this mineral. Salt is collected from Lake Argen, in Oran. Nitre is said to be present in the soil in some localities.

TUNIS.—West of the Gulf of Khabs there is a large salt lake. In the north-east is the mountain of Hadyfah, where rock salt is found. Most of the springs in Tunis not being warm are saline.

TRIPOLI.—There are salt lagoons in the Gulf of Sidra. Trona, or carbonate of soda, is met with towards Ghadamis, and in this district there is salt and gypsum. Between Tripoli and Fezzan, trona forms a thin bed, from which thousands of tons are annually taken.

EGYPT.—Salt is found in several places in the Lybian deserts. Bilma is famed for its salt lakes and beds, from whence large quantities are taken into Nigritia.

TINDINI and WADAMI.—On the road from Tiwt to Timbuctoo, there are extensive salt beds, which form a valuable article of commerce. Near Thebes is the Natron Valley. The natron is found as a crystalline crust in lakes and pools. It is a mixture of carbonate and sulphate of soda and salt. Trona consists of the same salts as natron, except that it contains twice as much carbonate of soda. At the beginning of this century about 36,000 cwt. of natron was collected annually. Natron appears to be derived from the decomposition of rocks and soils, but being generally accompanied by salt, it is probable that it gets its soda from it. In the Sahara, salt is plentiful.

ABYSSINIA.—The plains of this country contain enormous deposits of salt, particularly at Assa Durwa. There is a great salt plain between the Red Sea and the table land of Tigré, where the mineral is from 2 feet to 3 feet thick. Lake Assal affords much salt; this lake is 570 feet below the Red Sea, and is surrounded by a volcanic country.

In MOZAMBIQUE, nitre is said to exist.

CAPE OF GOOD HOPE.—There are numerous natural salt-pans along the coast. The salt lakes in the interior are too distant for it to form an article of export. Brine springs are common. The Cape salt of the interior is not considered so good for preserving purposes as bay salt; and in this particular may be allied in chemical composition to the Patagonian, and some other surface deposits. It is said that about Cradock there are springs that yield nitrate of potash, and that this salt is met with in the mountainous districts. Several singular salt lakes, some of great extent, exist far in the interior, and at some elevation above the sea; the Ntwetine is 15 miles broad, and 100 miles long. The country about the great inland sea of Maravi contains much salt, both it and copper being articles of barter.

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* On 28th July, 1853, a clause was introduced into the New India Bill, to the effect that the salt monopoly should cease, which was carried by 117 against 107.—*Sec. Soc. of Arts.*

## AMERICA.

**British America.**—In Lower Canada salt lakes and brine springs are found. The British American colonies take 2,000,000 bushels of salt from England.

**Iceland.**—The waters of the Geysers contain from 14 to 17 per cent. of salt.

**Greenland.**—The heat in the few summer days is so great as to evaporate the water left among the rocks by the tide.

**United States.**—In Europe gypsum and rock salt are usually found in the new red sandstone group; in this country gypsum and brine springs are mainly situated beneath the coal. Rock salt has been found for the first time in Virginia. There is first 50 feet of soil and rock, then a bed of gypsum 160 feet thick, and next the salt, which was found to be from 60 to 70 feet thick. The most important mineral springs—and there are many—produce salt containing from 10 to 45 per cent. From the Atlantic to the Apalachians and Rocky Mountains, and across into California, brine springs, salt lakes, creeks, and even rivers are met with, rendered so by means of rock salt through which water percolates. Hitchcock mentions that the majority of brine springs issue out of Silurian rocks. Nitrate of potash exists in the caves of Maryland, Georgia, and Kentucky. The recent researches of Fremont and others, during their explorations across the American continent, have taught us much as to the origin and existence of salt, and other saline bodies in those wild regions. Crossing the Rocky Mountains, and proceeding in a westerly direction, ranges of volcanic rocks are met with. Here are the Wha-satch Mountains, in which there is every reason to believe large quantities of rock salt exist, and which doubtless is the origin of the salt in the Great Salt Lake. It is near the centre of the Mormon Colony, the population of which in 1852 was 12,000. The water of this extraordinary lake is almost a saturated solution, composed of

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|---|---|
| Chloride of Sodium........ | 97·80 |
| „ Calcium......... | 0·61 |
| „ Magnesium .... | 0·24 |
| Sulphate of Soda.......... | 0·23 |
| „ Lime.......... | 1·12 |
| | 100 |

In summer it throws down salt, in winter sulphate of soda. As a general rule, in desert countries and dry soils, saline matters will be found on the surface; such would be found on all soils, were it *not* for rains and streams percolating, carrying the soluble materials into lower lands, and from thence to the ocean. There is a mud volcano near the Great Salt Lake, from whence steam and water issues. Muriate of ammonia, carbonate of soda, alum, and sulphur, are all found about here. Lieut. Gunnison counted as many as thirteen successive beaches on the shore of the Great Salt Lake, the highest being 200 feet above the valley.

Fremont, in continuing to the west of the Salt Lake, traversed a volcanic country, meeting with boiling springs and saline lakes; and having crossed the Sierra Nevada into California, met there with salt lakes, streams, and deposits of salt. The Author cannot help suggesting here the volcanic origin of the greater part of the saline matters in these regions; a portion, however, may be due to the decomposition of rocks, containing soda, potash, &c. If we follow Emory and his companions from Fort Leavenworth to California, similar characteristics are observed as are detailed by Fremont. All down the Rio Grande del Norte there is salt; salt streams flow into the Gila; and the country to the west is desert in places, and covered with salt, and sulphate, and carbonate of soda.

**Texas.**—On several parts of the coast, but particularly at Padre Island, the waters of the Gulf, during high tides, flow back into shallow hollows, when they evaporate, leaving a layer of salt. In the eastern part of the State, brine springs are abundant. South of Red River are many salt streams; the strata is a red sandstone, containing gypsum. There are many saline prairies in North-Eastern Texas. The western branch of the Brazos rises in a very large saline plain, formed by brine springs. In about 27° N. and 98° W. is the Texan Salt Lake, a few miles south of the Wild Horse Desert, and which supplies the Northern States of Mexico. The Lake appears to be formed by brine springs.

From July 1, 1849, to June 30, 1850, the United States exported 319,175 bushels of salt, valued at 75,013 dollars. The produce of salt of foreign countries exported from the United States during the same period was 31,046 bushels, valued at 9,668 dollars. The foreign imports of salt to the United States during the same period, the duty on which is 2*s.* 6*d.* per cwt., was 11,224,185 bushels, valued at 1,287,186 dollars. England imported 6,266,888 bushels, and the British West Indies 2,519,976 bushels. Taking the population of the United States at 25,000,000, and allowing the consumption to be 25 lbs. for each individual, this would give a consumption of 279,009 tons. If from this amount the quantity imported, 27,149 tons be deducted, there will remain 251,860 tons to be manufactured from brine springs principally. More than 6,000,000 lbs. of chloride of lime are annually imported from England and Scotland, and about 80,000 lbs. from Belgium and Ireland, valued at 175,628 dollars. The natural salt ponds on the Florida Keys yield about 100,000 bushels of bay salt.

**Mexico.**—In the north are extensive saliferous plains; in the central provinces salt, and other saline bodies exist. There is much tequisquite, or impure carbonate of soda, so necessary in reducing the silver ores. The lake of Peñon Blanco alone furnishes annually more than 250,000 fanegas of unpurified salt. One of the lakes on which the city of Mexico is built is salt and bitter: the valley of Tezcuco, in which it is situated, is bounded by a circular wall of mountains of porphyry. Salt and borax are said to have been paid as a tax under the ancient Mexican emperors.

**Central America, or Guatemala.**—Some bay salt is made on its coasts. In Nicaragua is the Laguna de Salinas, shut in by perpendicular rocks. At Istatlan (land of salt) there are brine springs.

**West Indies.**—Much bay salt is procured from the sea by solar evaporation. Snake Island yields 3,000,000 bushels annually. Bay salt is also procured from St. Martin's and Turk's Islands. It is said that rock salt has been met with in Hayti.

**Columbia.**—Some bay salt is made on its coasts; but a large proportion is extracted from a muriatiferous clay, first worked in the peninsula of Araya. We must not confound the salt disseminated in this clay with that contained in the sands on the sea shore on the coast of Normandy. Humboldt observes that he has seen muriatiferous clay at the level of the ocean at Punta Araya, and at 2,000 toises in the Cordillera of New Grenada.

VENEZUELA.—In Maracaibo is the natron lake of Lagunilla, high up above the sea, and producing 1,600 cwts. annually. There is rock salt in Zipaquira and Chita in New Grenada.

ECUADOR is principally supplied with salt from Peru.

BRAZIL.—Some bay salt is made on the coast of Bahia by solar evaporation. There are large salt plains in Matto Grosso with their brine springs. Salt is produced from something like the muriatiferous clay of Araya in the river San Francesco, as well as in the Rio Amargoso (bitter river).

PATAGONIA.—Darwin states that 300 miles south of the River Plate is the Rio Negro, and up this river there is a salt lake, shallow in winter, and in summer converted into a field of salt. Other similar lakes occur in the vicinity; some with a floor of salt, from 2 feet to 3 feet thick, even when under water in winter. This salt is very pure, only containing 0·26 gypsum and 0·22 earthy matter, and no iodic salts. The borders of these salt lakes are formed of mud, in which numerous crystals of gypsum lie embedded; whilst on the surface others of sulphate of soda lie scattered about. The salt lakes of Siberia have similar characteristics. Near Bahia Blanca the surface of the ground is encrusted with salt. The salt here, and in other parts of Patagonia, consist chiefly of salt and sulphate of soda. Darwin and Parchappe seem to think that these saline deposits may claim oceanic origin; but may they not rather have been washed down from the saline Andean regions and other mountain ranges, and since they have been on the plains, some of the chemical changes have gone on? Sir Woodbine Parish, in his work on Buenos Ayres, enters into the subject of so much salt being found in these localities, and states that the Great Lake Urre is salt and bitter. It is in 37°S. 66°W., and has many saline streams running into it from the Andes. Periodical expeditions have been made from Buenos Ayres to the Lake of Salinas for salt—one, in 1778, was composed of 600 wagons, 12,000 oxen, 12,600 horses, 1,000 men to load, and 400 soldiers, to prevent Indian attacks. It is probable that in the mountains to the S.E. of this lake there may be deposits of rock salt. The salt lakes and plains of the Pampas have long appeared to the Author to be formed and forming principally by the salt streams from the Andes; and on examining a good map of that region, it will be seen that these lakes have but few outlets in an easterly direction, otherwise the saline matters would flow on into the Atlantic. In the province of Tarija are the salinas of Casabindo, 45 leagues eastward of Atacama; the salt is hard and dry. At San Luis is the great salt lake of Benidero. The almost treeless Pampas extend from 22° S. to the southern limit of the American continent; much of its surface indicating the presence of saline matter. Nitrate of soda is said to exist in the provinces of La Plata. Helms, who went from Buenos Ayres to Potosi and Lima in 1789, commences by saying that the wells of Buenos Ayres are brackish. Approaching Tucuman he passed a salt desert 200 miles long; gypsum and salt being found on some of the ridges of the mountains. Large quantities of salt were met with about Potosi. Going onwards to Oruro, the country was covered with saline incrustations, composed of salt, gypsum, carbonate and nitrate of soda. Descending to Lima, saline substances were observed, and the flat valleys near Chilca were incrusted with salt. Now here is a long section, viz., from the Atlantic, across the Pampas, over the Andes to the Pacific, through arid countries, and salt is found superficially almost everywhere. This same disposition of things appears to occur with but little variation all over the globe, being more developed in those localities where rain is not abundant; for where it is abundant, it is conceived that it has washed, and continues to wash, the saline and soluble materials into streams and rivers, which ultimately find their way into the sea.

CHILE is principally supplied with bay salt from Peru, but British salt may be purchased at Valparaiso. In the mountains of Rancagua there is rock salt. Rock salt and salt lakes occur in several parts of the Cordillera; one is noticed by Darwin, near Copiapo, at 10,000 feet above the sea. Muriate of ammonia and much sulphur are met with in the vicinity of the various volcanoes.

BOLIVIA.—North of Copiapo is the desert of Atacama, where there is abundance of salt, containing a mountain district known as the "salt range." Dr. Reid, who crossed the desert from W. to E. in 1850, says, "Imagine a vast undulatory plain, whereon no trace of life is seen, where no insect shows itself, where no plant grows, where the stillness of the grave is only broken by the moaning of the wind, where the surface of the earth consists of a calcareous mass, out of which salt, nitrate of soda, and other saline products, show forth abundantly." In Salinas, Paria, and Lipes, there are numerous salt lakes and deposits. In Porco there are mines of rock salt at Tocallo. Cochabamba abounds in various saline materials. In La Paz, at Ayuayo, there is a brine spring, from which is produced a vast quantity of salt. Señor Pazos observes, "The saline bodies are produced without the aid of art; indeed, Peru, from its position under a tropical sun, its rains and continued droughts, seems a vast laboratory, where the great chemist, Nature, carries onher operations on the grandest scale, and leaves little for man to do." There are many lakes in the Andes, some fresh, others salt.

[*To be continued.*]

## HOME CORRESPONDENCE.

### ON PATENT RIGHT.

SIR,—Your correspondent "C. W. H." has taken time to mature his reply to my letter on Patent Right. I wrote merely *currente calamo*, and am open to rebuke if the impression has obtained that I otherwise than humbly solicited a discussion, or from any other motive than "to get at the truth."

"C. W. H.," says I am "an advocate,—an indignant advocate—of Patents." He mistakes, I do not advocate the form—nor do I invest all patentees with the character of inventors. I advocate the desirability of putting all *property* under the "protection," if we must use the term, of equal laws. By the word *property*—for we must settle our terms and speak by the card lest equivocation follow—by the word property, I mean land, mines, forests, watercourses, buildings, ships, machines, books, pictures, engravings, copyright of books, copyright of machines, or any other novel, or original articles useful to add to the pleasures, or to diminish the drudgery of humanity. To recognise property in matter only, and not in the mental operations which give value to matter is a mere begging of the question on the part of those who have cleverly gained possession of all the matter or material on which mind has to work. If the whole materials of earth have been embargoed by one set of people who grounded their claim on making use of them, another set might equally well claim to take them away on the ground of an improved use. But if the actual possessors say, "We will keep the whole property in matter, and recognise no property in mind," they declare practically that those who have shall keep, and those who have not, never shall have. This would be "Capital" in the hateful form in which demagogues love to pourtray it in order to gull Labour. If mental labour of an original kind is to be common property the instant it has left the owner's mind, mental labour will be very apt to take another course and divide material property also. It will not stop at the half socialism desired by real property owners, but will begin the world anew with a whole socialism, which would equalise matters by the strong hand,—a contest in which the strongest and cleverest would vindicate the eternal laws of Nature.

If "C. W. H." had fairly read my letter, surely he would not have penned the following paragraph:

"And I would beg in the outset to draw your correspondent's attention to these latter words that I have used, because he appears to me, with submission, rather to mistake the ground of the argument throughout his letter, in treating the question too exclusively as one between patentees and the public; as though the controversy were about some aboriginal right in the former which it was threatened to deprive them of, instead of, as it really is, a question as to the solid truth of the principle upon which the State extends to Patentees the benefit, or supposed benefit, of an exception to the general policy of English law."

The simple answer to this is the following sentence in my own letter:

"Society doubtless considers it a good thing to obtain all it wants as gratuitously as possible, and would be very apt to sacrifice the interests of a small class to attain its object; nor can the small class complain of this, for society has the right to determine whether it will issue premiums or not to quicken discovery; it is a question of bargain between society and a small class endowed with peculiar faculties, and if the small class be exorbitant, society may justly say, like the Yankee, 'Upon the whole, I guess I'd rather not trade.'"

It is not a question of "Patentees" with any "aboriginal right," or any such legal question. I recognise, as well as "C. W. H.," that there are no aboriginal "rights of man." The rights of man are simply the right of the strongest, physically and mentally—

"That they should take who have the power,
And they should keep who can."

A wise ordinance of Providence to determine the progress of humanity through the agency of the strongest; and by those who obtained possession, laws were made to perpetuate possession and create legal rights. But it is a fallacy to suppose that such legal rights may not come in time to be moral wrongs. The world can only go on by moral fitness, providing that the intellect of the world, beneficially used, shall attain power and guidance. And that country must ever be on the eve of trouble, where conservative property is endowed with the power of keeping down aspiring intellect.

Let us not quibble about words. The question is, "Is it desirable for the welfare of the community that origination should be fostered and stimulated; and if so, by what process shall this best be done?"

If progress be the law of humanity, then origination is one of the most valuable qualities of the human mind; and that nation must ever take the lead which is the foremost in invention wisely conceived and carried into operation with judgment. By the word invention, I do not mean a mere contrivance suggested by a defect, and the only result of which is a patchwork, but wise forethought that detects existing evils not recognised by the mass, and digests a plan or system to remedy the evils. Thus smoke is a nuisance; and the Legislature says, "Let the smoke be consumed." The philosophical inventor, going deeper, finds that smoke arises from the use of raw coal in which the chemical ingredients are not proportionately mixed to ensure perfect combustion, and he, after many experiments, finds out a mode of preparing fuel that will not produce smoke. As raw potatoes produce indigestion in the stomach, so raw fuel produces indigestion in the fire. How shall this benefactor be rewarded? Free trade says "Any one else might have discovered it, and he may set up a fuel factory." But he has no capital, and the coal-owners will not pay him a per-centage for his discovery. The real inventors are not called out by some growing want; they are foreseeing, and akin to prophets; and a common reproach to them is to tell them, "they are men in advance of their time." Sometimes a man of forethought points out by patent a thing obviously profitable, and his truth is instantly followed by a host of *contrivers*, like satellites around a star. This is so common, that it is a proof of the beneficial stimulus to progress by the presence of original-minded men.

"C. W. H." says,—

"And if it can be shown that the advancement of science, and its application to the arts, is not promoted, nor the efforts of inventors encouraged, by the Patent Laws, I submit that his case is lost; and that the hardship he assumes would accrue to *boná fide* inventors by the abolition of the law, is illusory."

This is not so, or there would be no patentees. It is the best chance they can get, and they take it in the absence of anything better. In numberless cases the patent does not give a *quid pro quo* to the inventor: in some it does; but if it be conceded that the inventor has a moral claim on society, it would be well for society to furnish him with some better mode of reward before it takes away the little it has given him. I quote another sentence:

"I say illusory because it has been brought to experimental proof, over and over again, of late years (as if it had not been an axiom of logic and geometry thousands of years ago), that what is best for *all* is best for *each;* that the whole includes all its parts; that what is true of a class is true of all comprehended in the class."

It would probably be best for all that the whole land of the community should be divided into much smaller portions than is the case at present. It would certainly increase production; and when the landlords are convinced of this, it will be time enough to make common stock of the brains of inventors.

There is a story told by Mrs. Barbauld, of a farmer, who, in walking over his field, found a partridge's nest, and immediately broke the eggs, because he would not be allowed to eat the birds after feeding them.

Surely it is not a hard thing to imagine that a great prize occasionally drawn by an inventor must have a very considerable effect in stimulating other inventors to exercise their faculties.

Money is sought for as a means of power; and surely money cannot be in better hands than those of originators. Surely there can be no great harm in making the inheritor of large property without work pay handsomely the labours of the man who lessens the general labour, or increases the general comfort of society. It is desirable that the originators should not be at the mercy of the powerful; and while originators continue to think the Patent an advantage—as the only means of establishing their mental claim—it would be as unjust to deprive them of the legal *right*—for it is held that "custom" is part and parcel of the law of the land—which the law has given them through a long course of years, as to break down the title of an author to his copyright on a book.

"And if 'Cosmos' will be good enough to accept Mr. Scott Russell's short statement of the question, that *Patents, instead of advancing, operate as an impediment to science*, we shall have the true issue before us, without any sparring about words or phrases."

I will accept no such thing; inasmuch as I find Mr. Scott Russell's name once more in the Patent-list since the time that he denounced them. And even supposing he were willing to give up his patent, it would prove nothing more than that the use of a large capital gave him sufficient monopoly to defy competition.

The real use of the patent is to prevent the unjust appropriation of the repute or profit due to an originating brain by the unscrupulous possessors of power; and if "C. W. H." affirms that it is not useful for that purpose, then let him show how best otherwise so desirable a thing may be accomplished. I am not alluding to the case of a wealthy amateur who may exhibit publicly his productions for the sake of ambition, but to that of an inventor of considerable powers, small means, and no wealthy friends.

Some three years back, on a fine summer evening, I was waiting for a steam-boat on the Blackwall pier. Two porters were conversing. A vessel of peculiar construction passed down: "That's Mr. * * * *'s new boat!" said one. "Goes in his name!" replied the other, who belonged to the sceptical tribe of men, "but he never inwented it. None of these here big swells inwents, they gets somebody to do it whose name nobody knows, and then they takes all the credit. That's how they does!" "Well," replied the other, "I spose somebody must inwent 'em." "Now I should like to know," said No. 1, "who inwented the first screw?" pointing to a screw steamer. No. 2, was sharp upon him; immediately exclaiming with a triumphant air, proud in his knowledge, "Why, Harkymeids, to be sure." "Don't believe it," said No. 1, "depend on it there was some one else in the back-ground as was the real inwenter, and Harkymeids gave it his name, and took all the credit!" So strong was his scepticism, that had the other proclaimed the name of the inventor of Harkymeids, he would instantly have denied it, and claimed the honour for some one behind him also.

This sceptical porter was but a type of the condition of mind which has become common amongst the Helots of society,—a disbelief as to the existence of truth, or honour, or honesty amongst rulers of all grades. They have a strong perception of a widely-extended fact, that society in many of its phases is a huge sham. The chief architect, the chief engineer, must have it supposed that from their brains emanate all originality, as Minerva from the head of Jupiter. It is all like the M.P.'s speech,—theirs because they have paid, or pretended to have paid for it. In too many cases, if the subordinate dares to hint at its birth from his brain, the penalty is the loss of his situation. And it commonly happens that men of small mind are most anxious to get credit for that they have no claim to, or aptitude for. By some process or other, most commonly a business faculty, they have come to be chief of a department, and then, like Wolsey, they—

> "Live not to be griped by meaner persons."

All human beings are born with some special aptitude. If they chance to find a position for its development, they are happy; and the world benefits by them, according to the quality. But many persons get into positions for which they have no aptitude, though they have a liking for the profits. And thus they pass their time for the most part in preventing others from achieving the same position for which they are better fitted, and from discerning their Chief's ignorance. Painful is the position of a youth or young man thus placed. With skill and talent he is obliged to defer to his task-master, and yet not until after a long period the chief becomes superannuated, does he get recognised, and perhaps some other business-man takes his place; for if there be one faculty which helps its owner to power more than any other it is the business faculty. The designer, the inventor, is deprived of his equitable right by a sham and a lie; and the Patent, a registered record, is the only means of preventing this. And frequently the act of patenting is regarded as a crime of *lese* chieftaincy and rebellion against lawful authority. It is inconvenient to an immoral man to recognise originality in one of lower rank. If a stranger comes before the immoral man of power with a new plan, the question is, "Is it a Patent?" If answered in the affirmative, then "It won't do." If no patent, still "It won't do;" till months or years have elapsed, when, if it be useful, the chief produces it as his own, and no man can prove to the contrary. It is this wide-spread injustice which would reduce us to Chinese, if there were no escape; for the existing property-holders have taken good care to guard their own rights. What are trade marks but a monopoly of a repute gained by an individual, and held by successors, even after the merit of excellence has ceased? What are names kept up by a firm after the name has died out? An attempt at monopoly by a lie. Shams and lies are not a wholesome state of art or commerce; and patents are one of the modes whereby truth and originalities are made apparent. If there be any better modes of "rewarding ingenuities," or something higher than the production of toys, which the phrase would seem to imply,—some clear method of stripping the masks from the "William Visors of Wincot," and giving their due to the "Clement Perkes's of the Hill," let us have it before us, and examine it. The rough and unscrupulous have the advantage of the modest and conscientious; and I have sat at a Society of Arts' Distribution of Prizes where a prize has been given by the Prince to a second inventor, while the original inventor was sitting by, having cast his bread on the waters, and not having arrived at one of the many days destined for him to find it.

To conclude: As a principle, I hold it advisable for a community that has appropriated all material property to hold out very handsome rewards for origination, so as to give the intelligent and aspiring their fair chance of attaining a share of this material property, for thereby they secure and increase their own stock; and if, straining too closely the conservative principle—proclaiming "what is yours of mind is *ours*, and what is mine of material wealth is *my own*"—the intelligent poor may be tempted to play out the game of this one-sided socialism to a further extent than the conservatives may desire.

As for the argument, that a monopoly granted to an individual to-day is an injury to others who might have invented the same thing to-morrow, or have it invented already in their closet; the reply is that the reward is offered in consideration of his making it patent or public, and "first come first served" is the only practical method. It is a limited monopoly, not an entailed estate. There is another mode for discoverers who like not patents, to prevent the patenting by others—that is, to publish their discoveries to the world themselves. But till all factories are laid open, and all trade secrets disclosed, I for one shall continue to believe that the most strenuous opponents of patents do not belong to the class of men born with a special faculty for invention. The originator, the maker, the poet, the pro-creator, are specific parts of humanity, and differ as much from those possessing the mere imitative, distributive, and accumulative faculties as the oak-tree differs from the ivy or the ivy from the oak.

If "C. W. H." agrees that origination is desirable and should be rewarded in all things, books inclusive, it is incumbent on him to point out some better method than the plan of "property," which the world has hitherto deemed so useful for civilized society. If we are to come to the "freach and frall" principle advocated by Mr. Owen, as "C. W. H." says, "the whole includes all its parts," the principle on which Mr. Denison gives his lock to the community,—but probably not including his more valuable property in land,—it will doubtless be found that one coat and one dinner at one time will serve the inventor as well as his neighbours. But even then there will be chiefs and leaders quoted and signed by nature to guide and govern their fellows, and push the "shams" from their stools.

I am, Sir, yours,

August 9, 1853. COSMOS.

## THE DUTY ON PAPER.

SIR,—Having occupied so much of your space on previous occasions in my remarks on the paper-duty, I must apologise for intruding one or two further observations.

It is gratifying that the views expressed in my former communications should be corroborated to so large an extent by the answers received in reply to the questions proposed by the Society. The principal fault I have to find with those answers is, that in several instances the judgment of the writer has been evidently warped by a consideration of his individual interest. Some appear to think that the most important part of any Act of Parliament on the subject would be a clause to protect from loss those who might possess large quantities of paper at the period of the repeal of the duty. I believe the trade would experience such an expansion as would speedily reconcile these nervous gentlemen to any immediate loss they might sustain; but if such should not be the case, I cannot admit for a moment that the gain or loss to a few engaged in a special business should be allowed to impede the removal of a serious evil to the many.

I observe with regret that not a single answer (so far as I can perceive) has been received from Ireland. Is Ireland not interested in the question? Ireland derives the supply of nearly all its better quality papers from England and Scotland; and while England consumes immense quantities yearly of Scotch paper of good quality, the paper imported from Ireland is small in quantity and of very inferior quality. No satisfactory reason can be assigned for this state of the manufacture in Ireland. It is very desirable to obtain a return of the number of Revenue Officers partially or wholly employed in attendance on paper-mills in Ireland, and the amount of duty collected; as it may not be generally known that at some of the mills in that country one or more officers are in constant attendance, the salaries paid being a very large per centage on the duty collected—another argument for its repeal. The unsatisfactory condition of this branch of Irish industry is indicated by the fact that at the Dublin Exhibition only two Irish manufacturers of paper exhibit their productions. I conclude with the hope that some of your correspondents in Ireland will devote their attention to this question, and transmit to you the result of their investigation.

Yours truly,

WAIMA.

## PROCEEDINGS OF INSTITUTIONS.

TAMWORTH.—A meeting of the Committee of the Tamworth Library and Reading Room, over which Sir Robert Peel, Bart., M.P., presided, was held on Monday last. It was resolved, that the Annual Meeting of the Representatives of the Midland Counties Association of Mechanics' and similar Institutions should be held, under the Presidency of Sir Robert Peel, Bart., M.P., at Tamworth, on Tuesday the 20th of Sept. The Delegates from the seven Midland Counties will meet in the morning for the discussion of questions of mutual interest, and will attend a *conversazione* in the evening. Several eminent friends of the elevation of the working-classes are expected to address the company. The Committee was informed by Sir Robert Peel, that the name of the Tamworth Library and Reading Room had been inserted in the deed founding the Working Man's Peel Memorial, as an annual permanent recipient of books, pamphlets, &c., to be provided under its trusts.

## MEETING FOR THE ENSUING WEEK.

SAT. Medical, 8.

## MISCELLANEA.

A NATIONAL MUSEUM FOR SCOTLAND.—A few days ago, Dr. Lyon Playfair, accompanied by Baillies Fyfe, Brown, Douglas, and Boyd, inspected various sites which have been thought eligible for a Scottish National Museum, for which it is almost certain Government will be prepared by next session of Parliament to propose a grant. The County Hall, the Exchange Bank, and other places, were examined, but that which we believe has been thought most suitable is a site already spoken of—the ground near the College, including the property now occupied by the Trades' Maiden Hospital. Although Dr. Playfair has thus visited these various sites, we are not aware that his report, if he makes one to the Government, will altogether influence their determination, as it is understood that no definite decision will be come to until Mr. Cardwell satisfies himself on the subject, and for this purpose he will visit Edinburgh, we believe, soon after the prorogation of Parliament.—*Scotsman.*

PHOTOGRAPHY.—M. de Brebisson gives the following process for printing positives. He takes 7 ounces of rain or distilled water, 93 grains of chloride of sodium, or what is better, chloride of ammonium, 83 grains of tapioca de groult; for bistre tones, 30 or 40 grains of tartaric or succinic acid may be added. The mixture is placed on the fire; and when the tapioca is dissolved, it is filtered through linen. By means of a wide, flat brush, the filtered liquid is laid evenly on strong white paper, and any streakiness is got rid of by using a large badger-hair brush worked over the paper in circles; it is then dried, and should be kept in a box. When required for use, it should be floated for five minutes on a solution of nitrate of silver, 90 grains to the ounce of water. Those who like the effect of albuminized paper may add to the mixture when cold the whites of two eggs beaten to a froth. The fineness and brilliancy, however, of an albuminized paper may be obtained by brushing the positive picture over with the following mixture: Dissolve over a gentle fire 77 grains of gum arabic, 77 grains of isinglass or gelatine in an ounce of water, and strain it through a piece of linen. The whites are thus not rendered yellow, as is the case with albumen.

**HEALTH OF WOOLLEN FACTORIES.**—Professor Simpson (of Edinburgh) is at present engaged in investigating into the health of people employed in woollen factories, with a view of ascertaining to what extent the popular belief is correct, that those so employed are almost universally free of chest complaints. For that purpose schedules have been left with the different manufacturers here, for them to fill up. These schedules have reference chiefly to those who work amongst oil, and those who do not, in order, we understand, to find out whether oil has a tendency to prevent or cure pulmonary complaints. We have no doubt that our manufacturers will put themselves to some trouble in order to give a careful and correct answer to the various queries put forth by the talented and public-spirited Professor; nor have we any doubt that this investigation will lead to the establishment of the fact that employment in woollen factories is one of the most healthy, if not the most healthy, of all in-door labour, and even more healthy than most out-door work.—*Kelso Chronicle.*

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 4th August*, 1853.

818. Lighthouses—Return.
826. National Education (Ireland)—Copy of a Resolution.
833. Poor-Law (Bedminster Parish)—Copy of Memorial.
838. Preliminary Inquiries Act—Return.
861. Civil Services—Supplementary Estimate, Class 5.
856. Standing Orders Revision—Report from Committee.
860. Bill—Defacing the Coin.
Pleuro-Pneumonia in Cattle—Further Papers.

*Delivered on 5th August.*

641. Liverpool Election—Report from Committee.
836. Customs Duties (Colonies)—Return.
828 (*b*). Bills—Customs Consolidation—Proposed Clauses.
858. ,, —Customs Acts Consolidation (amended).
852. ,, —Betting-Houses (amended).
866. ,, —Militia Ballots Suspension, and Militia Law Amendment.

*Delivered on 6th and 8th August.*

872. Trade and Navigation—Accounts.
768. Indian Territories—Fifth Report from Committee.
715. Police—Report and Evidence.
854. Bill—Crown Suits.
859. ,, —Linen and Manufactures (Ireland).
871. ,, —Registrar of Meetings.
873. ,, —Smoke Nuisance Abatement (Metropolis), amended.
874. ,, —Copies of Specifications Repeal (as amended in Committee, and on re-commitment).
875. ,, —Female Convicts.
876. ,, —Loan Societies.
877. ,, —Apprehension of Offenders Act Amendment.
878. ,, —Marriages, Holy Trinity Church, Hulme, Validity.
879. ,, —Stock in Trade Exemption.
880. ,, —Ecclesiastical Jurisdiction.
869. ,, —Charitable Trusts (amended).
Births, Deaths, and Marriages—Fourteenth Report of the Registrar-General.
Prisons (Southern and Western District)—Eighteenth Report of Inspectors, Part 3.
Public Records—Fourteenth Report of the Deputy-Keeper.
Cuba—Correspondence.

*Delivered on 9th August.*

674. Criminal and Destitute Children—Report and Evidence.
740. Accidents in Coal Mines—Second Report and Evidence.
822 (1). Drainage (Ireland)—Returns.
890. Bills—Copyhold, &c., Commission Continuance.
891. ,, —Commons Inclosure (No. 3).

*Delivered on 10th August.*

780. County and Borough Lunatic Asylums—Abstract of Accounts.
806. Ramsgate Harbour—Report of Sir William Cubitt.
837. Screw Squadron—Copies of Orders from the Admiralty, &c.
847. Customs (Isle of Man)—Copy of Treasury Letter.
850. Capture of Bruné—Copies of Sir Thomas Cochrane's Memorial.
862. Piracy—Return.
893. Bills—Entails (Scotland), Lords' Amendments.
899. ,, —Public Works Act Amendment (Ireland), as amended in Committee.

## PATENT LAW AMENDMENT ACT, 1852.

It is understood that the Commissioners of Patents have it in contemplation to issue some New Rules. They will be given in the JOURNAL as early as possible after their appearance.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 5th August*, 1853.

*Dated 30th May*, 1853.

1330 W. Green, Islington—Preparing yarns.

*Dated 20th July.*

1716. M. Poole, Avenue-road, Regent's-park—Gas regulators. (A communication.)

*Dated 21st July.*

1724. W. Birkett, Bradford—Cleansing soap, &c., for using again for cleansing wools, &c.
1725. S. C. Mayer, Paris—Domino bearer.
1726. W. Thorp, Collyhurst, Manchester—Machinery for finishing and embossing woven fabrics.
1728. E. and H. and F. C. Cockey, Iron-foundry, Frome—Cheese.

*Dated 22nd July.*

1729. J. Murdoch, Staple-inn—Stamping metals. (A communication.)
1730. A. J. Austen, Trinity-place, Wandsworth—Mould candles.
1731. T. Gray and J. Reid, Newcastle—Files and rasps.
1732. J. Gillam, Woodstock—Cleansing corn, &c.
1733. G. Spencer, 12, Manor-road, Walworth—Springs for carriages.
1734. M. A. Rylands, Kingston-upon-Hull—Yards and spars of ships. (A communication.)

*Dated 23rd July.*

1735. C. W. Manby, 3, Grove-villas, Finchley—Travellers patent shaving-brush.
1736. W. Huntley, Ruswarp, Whitby—Engines worked by steam, air, or fluids.
1737. A. B. Lalande, Bourdeaux—Preventing accidents on railways.
1738. F. Warner and J. Lee, Jewin-street—Water-closets and urinals.
1739. J. Hall, Bedford—Mangle.
1740. J. M. Napier, York-road, Lambeth—Printing-machines.
1741. S. Barlow, jun., Stakehill, and J. Pendlebury, Crumsall, Lancashire—Machinery for bleaching.

*Dated 25th July.*

1743. J. A. F. de Rostin, 4, South-street, Finsbury—Construction of floating bodies.
1744. A. Clark, Gate-street, Lincoln's-inn Fields—Regulating and indicating speed of engines.
1745. W. Ireland, Leek, Staffordshire—Melting iron, &c.
1746. J. Collins, Oxford—Paper.
1747. R. Bitten, Dartford—Ascertaining supply of water to steam-boilers.
1748. W. De la Rue, Bunhill-row—Treating tar or naphtha.
1749. J. Ferguson, Heathfield-works, Glasgow—Kilns for baking clay, &c.
1751. W. E. Newton, 66, Chancery-lane—Machinery for stopping cables. (A communication.)
1752. A. V. Newton, 66, Chancery-lane—Cutting tools. (A communication.)

*Dated 26th July.*

1754. F. Cole, 159, High-street, Camden-town—Lithographic press.
1755. F. Cole, 159, High-street, Camden-town—Inking in printing.
1756. — Money, Chudleigh, Devon—Bridle.
1757. T. Banks, Derby, and H. Banks, Wednesbury, Staffordshire—Stopping railway trains, &c.
1758. T. Buxton, Malton, Yorkshire—Mill for grinding.
1759. F. M. Lyte, Florian, Torquay—Iodide of potassium.
1760. J. Barrans, Peckham-lane, Deptford—Steam boilers.
1761. J. Giblett, Trowbridge, Wilts—Woollen and other cloths.
1762. L. E. Hopkins, New York—Hat-bodies of fur, &c.
1763. A. W. Warder, 1, Sydney-street, Brompton—Gas stoves.

*Dated 27th July.*

1764. F. Arding, Albert Iron-works, Uxbridge—Thrashing machines.
1766. P. A. L. C. Fontainemoreau, 4, South-street, Finsbury—Tiles for roofing. (A communication.)

*Dated 28th July.*

1768. E. Herring, Southwark—Sulphate of quinine.
1770. J. F. Stanford, 9, Arundel-street, Strand—Draining dwelling-houses, &c.
1772. B. C. Brodie, jun., 13, Albert-road, Regent's-park—Preparing black lead.

### APPLICATION WITH COMPLETE SPECIFICATION FILED.

J. C. de Medeiros, Passy, near Paris—Preserving metals from corrosion. (A communication.) 1st. Aug., 1853.

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## WEEKLY LIST OF PATENTS SEALED.

*Sealed August 3rd, 1853.*

290. Thomas Spiller and Anthony Crowhurst, of Red Lion-square—Invention for propelling vessels.
291. Manoah Bower, of Birmingham—Invention of a new or improved apparatus to prevent the throwing up of mud by the wheels of vehicles.
292. John Heckethorn, of Marquis-villas, Canonbury—Invention of an improved colouring matter for coating or covering the exterior or interior of buildings, some of the ingredients of which such colouring matter is composed being capable of conversion into size, paste, and ground colour, for priming or giving the first coat or covering to work intended to be coloured with oil paint.
293. William Scarlett Wright, of Pont-street, Belgrave-square—Invention of an improved bath.
294. George John Newbery, of East Greenwich—Improvements in hinges. (A communication.)
297. John Henry Johnson, of Lincoln's-Inn Fields—Improvements in gas-burners, and in regulating the combustion of gas. (A communication.)
306. George Winiwarter, of Red Lion-square—Improvements in the application of explosive compounds.

*Sealed 4th August.*

313. William Walker, of Manchester—Improvements in apparatus to be employed for the purposes of drying.

*Sealed 4th August.*

318. George Hewitson, of Bradford—Improvements in machinery or apparatus for measuring or indicating the length of yarn as it is spun or wound on bobbins or rollers.
319. Antoine Wollowicz, of Paris—Improvements in primers for fire-arms.
321. Charles Frederic Werckshagen, of Barmen, Prussia—Improvements in the manufacture of carbonate of soda and potash.
322. André Michel Massonet, of Paris—Improvements in alloys of metals, and of other substances, and also in the application of the same to various useful purposes.
337. John Buchanan, of Leamington—Invention of an improved propeller, as to affixing the blades in the boss, and affixing the bosses to the spindle or centre shaft, and in the mode of placing it, and in controlling, lowering, and detaching the same.
355. William Fulton, of Paisley—Improvements in the treatment, cleansing, or finishing of textile fabrics.
371. George Winiwarter, of Red Lion-square—Improvements in fire-arms.
376. William Pidding, of the Strand—Improvements in crushing, drilling, or otherwise treating ores, stone, quartz, or other substances in mining operations, and in the machinery or apparatus connected therewith.
377. William Pidding, of the Strand—Improvements in the treatment of oleaginous, fatty, or gelatinous substances, for purifying, decolorizing, compounding, or clarifying the same.
414. William Pidding, of the Strand—Improvements in the treatment and preparation of saccharine substances, and in the machinery or apparatus connected therewith.
435. James Anderson, of Auchnagie—Improvements in obtaining motive power.
492. Robert Griffiths, of Great Ormond-street—Improvements in propelling vessels.
668. Malcolm Baxter, of Glasgow—Improvements in steam-engines and pressure-regulating valves.
694. John Barsham, of Kingston-upon-Thames—Improvements in apparatus for communicating between the guard and engine-driver, or other persons, in a railway train.
822. Edward Simons, of Birmingham—Improvements in telegraphing or communicating signals.
826. Henry Alfred Jowett, of Sawley—Improvements in apparatus for heating, which improvements are particularly applicable for generating steam or evaporating solutions, and may be applied for heating purposes generally.
994. William Johnson, of Lincoln's-inn Fields—Improvements in the means of retarding and stopping railway trains. (A communication.)
1056. James Greenwood, of New Accrington—Improvements in fixing mordants on fabrics.
1193. James Higgin, of Manchester—Improvements in printing or dyeing woven or textile fabrics, and in the manufacturing of certain substances to be used in the arts or processes of dyeing and printing.
1302. Julius Augustus Roth, of Philadelphia—Improvements in the mode of, and machinery for, treating the fibres of flax, hemp, China grass, and other analogous substances, preparatory to spinning. (Partly a communication.)
1366. Isaiah Kendrick, foreman to Messrs. Horton and Son, of Southwark—Improvements in steam-boilers.
1376. John James Kerr, of Gloucester-grove West, Old Brompton—Improvements in the manufacture of cartridges.
1380. William Dray, of Swan-lane—Improved method of driving shafts.
1404. John Horrocks, junior, and James Dunlop Horrocks, of Down street, Piccadilly—Improvements in the manufacture of detonating or percussion caps. (A communication.)
1411. Joseph Smith, of Bradford, Yorkshire—Improvements in machinery for preparing and spinning wool, hair, silk, flax, and other fibrous substances.
1412. Joseph Smith, of Bradford, Yorkshire—Improvements in combing wool and other fibrous substances.
1419. Josiah Moore, of Clerkenwell-close—Improvements in respirators.
1421. Alfred Vincent Newton, of 66, Chancery-lane—Improvement in spinning machinery. (A communication.)
1458. William Baddeley, of Angel-terrace, Islington—Improved label-damper.

*Sealed 8th August.*

335. Auguste Edouard Loradoux Bellford, of Castle-street, Holborn—Improvements in the treatment of bituminous and asphaltic matters, rendering them applicable to various useful purposes. (A communication.)

*Sealed 9th August.*

340. Thomas Reynolds, of Singleton-street, Hoxton, Henry Reynolds, of Hoxton, and Stephen Reynolds, of Charles-street, Westminster—Improvements in the means of retarding the progress of carriages.
390. Benjamin Greening, of Manchester—Improvements in machinery for making fences and other similar articles of wire.
470. Emile Adolphe Herrmann, of New Broad-street—Improvements in machinery for manufacturing woollen cloth. (A communication.)
474. John Hynam, of Wilson-street, Finsbury—Improvements in the mode of manufacturing wax or composition tapers, and in the machinery or apparatus for that purpose.
475. Benjamin Price, of Whitechapel—Improvements in the construction of furnaces or flues of steam-boilers, coppers, and other like vessels for heating or evaporating liquids.
532. Robert Barclay, of Montrose—Improvements in rotatory engines for obtaining motive power, and for transmitting aëriform bodies and fluids.
723. Robert Walker, of Glasgow—Improvements in working and increasing the safety of railways.
728. Thomas Smedley, of Holywell—Improvements in steam boilers.
981. Henry Houldsworth, of Manchester—Improvements in machinery used for combing cotton, silk, silk-waste, flax, tow, wool, and other fibrous substances.
1030. Edward Bird, of Birmingham—Improvements in the construction of certain kinds of vehicles.
1099. James Walker, of Bow—Improvements in turn-tables used for railways and other purposes.
1131. Conrad William Finzel, of Bristol—Improvement in refining sugar.
1223. Bernard Peard Walker, of Wolverhampton, and James Warren, of Mile-end Road—Improvements in the manufacture of iron.
1306. Aristide Michel Servan, of Philpot-lane, London—Improvements in treating fatty matters, to render them suitable for the manufacture of candles.
1346. James Stock, junior, of Ovenden—Improvements in looms for weaving.
1379. Joseph Burch, of Crag Hall, near Macclesfield—Improvements in fans, blasts, or blowing apparatus.
1416. James Robert Napier, of Glasgow, and William John Macquorn Rankine, of Rosebank House, Rutherglen, Lanark—Improvements in engines for developing mechanical power by the action of heat on air and other elastic fluids.
1423. Joseph Westwood and Robert Baillie, both of Poplar—Improvements in the construction of iron ships.
1438. Robert William Sievier, of Upper Holloway, and James Crosby, of Manchester—Improvements in looms for weaving.
1440. John Henry Johnson, of Lincoln's-inn Fields—Improvements in railway-breaks. (A communication.)
1443. Alfred Vincent Newton, of Chancery-lane—Improved mode of manufacturing cast-steel. (A communication.)
1445. Arthur Parsey, of Crescent-place, Burton-crescent—Invention of a revolving engine, to be worked by steam, air, gases, or water.
1507. William Edward Newton, of Chancery-lane—Improved manufacture of handles for knives and other similar articles. (A communication.)

# SOCIETY OF ARTS.

### FRIDAY, AUGUST 19th, 1853.

## NOTICE TO INSTITUTIONS.

The Council have much pleasure in announcing, that the Committee of Privy Council on Education, and the General Board of Health, have extended their former grants of Reports, &c., to those Institutions which have recently joined the Union.

They have also to announce, that the Very Reverend the Dean of Hereford, has placed at their disposal fifty copies of each of the following works: "Suggestive Hints towards improved Secular Instruction," and "An Improved and Self-paying System of National Education;" also, that John Bright, Esq., M.P., has likewise placed at their disposal forty copies of "Welford on the Game Laws," for distribution to the Institutions in Union. As the number of these works is less than the number of Institutions in Union, it is requested that special applications may be made, which will be registered in the order of their receipt, and the books sent out in the next parcel.

The following Institutions have been taken into Union since the last announcement:

285. Berkhampstead, Mechanics' Institution.
286. Brighton, London and Brighton and South-Coast Railway Literary and Scientific Institution.
287. Colchester, Mechanics' Institution.

## AMERICAN REPORT OF THE GREAT EXHIBITION OF 1851.

The Commissioner of Patents for the United States of America prints, in his Annual Reports to Congress, the report of Mr. Riddle, the American Commissioner for the Exhibition of 1851. The Report is too long to give entire in the Journal, but as the members of the Society, within whose walls the Exhibition had its birth, will naturally feel a curiosity to know what their Transatlantic brethren think of the Hyde Park display, some account of the Report will not be unacceptable. The Report takes each class separately, touching on the more prominent objects in it, entering into details with respect to manufactures, sources of supply, &c., which are unnecessary for the present purpose to touch upon here; but the opinions, observations, and conclusions arrived at, and comparisons made, if not always accurate, or in accordance with the notions of this side of the water, will at least be read with interest.

After speaking of the vast importance of exports of cotton to England, exceeding annually 470,000,000 lbs.—

"An export constantly increasing, and every year making Europe more dependent on us as producers, and we more dependent upon Europe as our great market;" and entering into an examination of the samples from the United States, embracing specimens from five States, the report characterizes them as "first-rate specimens;" not "museum samples, but just what was the article raised on the plantation. * * * * * When looking over the other samples of cotton in the Exhibition, one impression never left the mind,—and that was, that the culture of all cottons other than ours is slovenly conducted." The reporter, after going into numerous details, concludes this branch of the subject by saying, "From what I have said my convictions must be apparent to the reader, that the cottons raised in the East can never successfully rival those which are the great staple of the South. The reasons for this are undoubtedly to be found in the great differences of the soil of the two parts of the world. To the effects produced by climate, although they are doubtless considerable, I do not attach so much weight. But to the total unlikeness of soil, shown not in appearance, but by chemical analysis, the unlikeness of the United States and the East India cottons is to be attributed. The soil in the former —especially the soil in which the finest long staple cotton is grown—is black, sandy, but rich in decaying organic matter; the soil of the latter is also black, but it is a calcareous, clayey soil, the debris of volcanic rocks. Though both black in colour, the two soils are entirely different in chemical and physical characters. The one is rich in organic decayed matter; the other almost sterile from its want. The climates, indeed, widely differ, and by that difference produce their appropriate effects. But the soils, were the climates the same—the black soil of India and the black soil of the United States, so long supposed to be identical—are too widely different to produce the same results, and by their opposite natures sufficiently account for the deterioration of the transplanted cotton plant."

Speaking of the statuary porcelain he says, "It would be difficult to over-estimate the value of this material. * * * * The successful position taken by the English potters in the Exhibition was due mainly to its introduction, and its prompt adoption by the public. The increased love of art which has been created by the multiplication of examples of statues of a high order through the process, is one of the most pleasing of the results which has attended it. Of the salutary influence of the popular cultivation of art, in a moral and social point of view, there can be no doubt; and on this ground among others, especially in our country, where works of art must necessarily be, for many years to come, confined to copies, we desire to see the fine examples in statuary porcelain largely multiplied."

In furniture the inferiority of the United States is admitted. "We have not," says the reporter, "the wealth (and Heaven grant we may never have) in the hands of the few, which can find only in the result of years of toil a return adequate to its demands; nor have we such poverty among the many as will render labour at mere living wages a godsend thankfully received, and readily embraced. Our mission is other than to equal or excel the world in the products of taste. We have lessons to teach in the capacity of man, rather than lessons to learn in his handicraft. * * * * Compared with the starving slaves of Old Egypt, Europe is as far advanced as we beyond the miserable system that confines the lace-worker to his perpetual dungeon, or ekes out to the Manchester weaver his miserable dole." "* * * * *. In furniture, upholstery, fittings, and general decoration of interior, England has of late years occupied a place of marked inferiority, as compared with her continental neighbours. The furniture of England has ever been in good repute for its sterling qualities, but in form and ornament it has been of the worst." The reason given is the want of training or guides for the workmen. The "sideboard" and "cabinet" marked "Sheffield School of Design," is especially pointed out as "wretched in conception," but "admirable in execution." Referring to the Austrian furniture, it is remarked, "that only in an old country where feudal customs still obtain, while labour toils without adequate remuneration, and where wealth is unequally distributed, could it be manufactured or patronized."

As to "furs" it is said, "the day has been, perhaps is now, when any large depôt in furs in New York can show in its stock on hand an amount exceeding in value by ten times all that was arrayed in the Crystal Palace. In variety, however, it was worthy of its place." Speaking of sables it is said, "The use in England is mainly confined to the City of London, which city comprises about one-eighteenth of the metropolis called London, where municipal law and custom enjoins its wear by the lord mayor, the alderman, and sheriffs, each having their robes and gowns furred with sable upon all state occasions according to their rank. It is generally known that the livery of London constitutes the freeholders of the corporation. To be free from certain taxes, to buy and sell certain goods as tradespeople, to vote for city officers, and to possess certain other privileges one must belong to the livery—that is, he must be a member of one of some eighty companies, such as the goldsmiths, drapers, pewterers, ironmongers, tailors, &c., which have been in existence from 500 years and more back, paying his annual fee in order to enjoy the freedom of the city. These companies are generally very rich, and have what is called a court, composed of masters, wardens, deputy wardens, &c., whose chief duties appear to be the appropriation of the income of the company they represent, towards weekly and monthly public dinners for themselves and wives. These members of the court are obliged to wear a certain dress, lined and faced with Russian sable fur, upon all public occasions; and as these occasions, where the funds of the company are well vested, require observance some fifty times in the year, the market for the sable fur is not likely to be soon dull—certainly not so long as Parliament allows London to retain its privileges as a close corporation."

In the concluding summary the reporter says: "The genius of Great Britain is mechanism. More than in any country on the globe, mechanism is there extending its dominion over the whole empire of labour. In textile fabrics, in fashioning iron like wood to the most exact proportions, in working the printing press and navigating the ocean, in all agricultural pursuits everywhere, in anything lightening the burden of toil and rescuing human life from dangerous pursuits, mechanism reigns supreme. Beyond this the genius of Great Britain has not gone. Ornament in all her productions is inseparably wedded to usefulness. The creation of the beautiful with her artisans rests only in the adaptability of mechanism. It is said that a better and purer style of national industry is beginning to be observable in England; but however this may be, her best productions, when placed beside similar productions from the continent, show violation of harmony in colour and design, and evidences of neglected taste to the most casual observer. But in mechanism in its highest and noblest ends, in its tendencies to relieve labour of its drudgery, and to delegate to iron, to steam, and to other powers of the inanimate world the burden of toil, Great Britain must be acknowledged to be in advance of all the world."

After adverting to the interest raised by the peculiar products of China, Tunis, Egypt, Persia, and to the degeneracy displayed in those of Greece, the reporter speaks of the "progress" displayed in the Turkish department, remarking, "The high cost of these shows, indeed, that her improved manufactures are but in their infancy; but it also shows that the country possessing the greatest natural resources of any country in Europe, has started in that race where indomitable determination, the strongest characteristic of the Mussulman, is the sure guarantee of success."

Sardinia is specially pointed out as taking the lead in the states of Italy; and the collection of France is specially spoken of as "the most attractive and extensive of any in the foreign department. * * * * * It is the peculiar characteristic of French industry, that all its products touch upon the wants, the comforts, and the luxuries of the million. They deal alike in the beauty of the cottage, and the embellishment of the palace."

The various results of Belgium, it is said, show "that there is not in the world a more industrious, artistic, or pains-taking people."

The Zollverein "showed a force and enterprize of the manufacturing spirit which bid fair to supplant England and France in the markets of the world. In the element of cheapness in production, none can equal the Germans."

The concluding paragraphs of the Report are given at full length, as characteristic of the spirit in which the whole Report is drawn, and of the light in which the New World contemplates the Old.

"Of Norway, Sweden, Denmark, and Switzerland, it is unnecessary to say more than that each, in its industrial products, reflected its peculiar national characteristics. This, too, was equally true of Russia. From these, the grand, and striking, and regal, only came. The seal of the Autocrat was stamped on everything. In all the beauty, and magnificence, and costliness, and display of the Russian division, one saw nothing of the people. It was an exhibition of the enterprise of the executive—of the power of the sovereign—of the resources of the exchequer. It is not intended to be said that no individual contributions were received from Russia. The costly vases made, malachite doors, and heavy silks, were many of them the production of manufactories built up by private enterprise; but in even these the hand of an absolute power was everywhere apparent, encouraging or restraining, tempting forward by the hope of reward, or holding back by the fear of punishment.

"Perhaps the industrial products of no two countries which ever existed, presented so many points of strong contrast as did those of Russia and the United States at the Exhibition. In the one case, everything which was shown was costly; in the other cheap. The compartments of Russia, splendidly fitted up and appointed, were attractive from the princely magnificence of the articles displayed. The compartments of the United States, on the contrary, decorated with great plainness, drew admiration from those who visited them, by the adaptability of every thing they contained for the purposes for which they were intended. Thousands never ceased to gaze with wonder on jewels, embroidery, velvets, silks, and furs contributed from the various imperial establishments of St. Petersburg and Moscow. There were others, however,—and they too were counted by thousands before the Exhibition closed—who found in the water-pails, made by machinery, and furnished at one-quarter the usual price;—in the pegged boots and shoes, between the upper leather and soles of which not a wax-end was drawn;—in the improved household, barn, garden, and field implements;—in the bell telegraphs, and spring chairs, and cooking ranges, and hot-air furnaces, and camp bedsteads;—a degree of intelligent interest excited by the display in no other part of the building. The Russian exhibition was a proof of the wealth, power, enterprise, and intelligence of Nicholas; that of the United States, an evidence of the ingenuity, industry, and capacity of a free and educated people. The one was an ukase of the emperor to the notabilities of Europe; the other, the epistle of a people to the working-men of the world.

"The history of our portion of the exhibition—of the lack of all pecuniary aid from the government—of its early discouragements, vicissitudes, and trials—of its gradually emerging from darkness—of its stoutly-fought battles, its victories, and success, and of its hardly, but fairly, won honours at the close—is all too well known to the whole world to need recapitulation here. It is sufficient to say that we were not misunderstood. We might have sent far more of our productions to England; but that would only have confirmed, not altered, the verdict which the world has given us. We alone of all people exhibited the products of unfettered, untaxed, unpatronized labour. We showed the results of pure democracy upon the industry of men. We demonstrated the progressiveness of the human mind when in the enjoyment of liberty. And we alone, from among the assemblage of two score nations, bore away the palm for intelligent labour."

## THE PAPER DUTY.

### QUERIES PROPOSED BY THE SOCIETY OF ARTS, MAY 4TH, 1853.

### No. 5.—To Newspaper Proprietors and Editors.

The following replies have been received from different Newspaper Proprietors in answer to various Queries as to the effect of the Duty on Paper in their business. They are published in continuation of those received from Paper Manufacturers, Wholesale Stationers, Manufacturers from Paper and Manufacturers using it, and Publishers, which will be found in Nos. 33, 34, 36, and 37 pages, 401, 413, 437, and 449 of this Journal.

### 1. Does the Duty keep down the sale of Newspapers?

The Editor of *Aris's Birmingham Gazette* says, "No."

The Proprietor of the *Cheltenham Free Press* says, "I believe that everything which tends unnecessarily to enhance the saleable price of an article does tend to diminish the sale, especially where the article is of a very 'perishable' nature, like a newspaper. A large proportion of the newspapers read by the working classes are those which are met with in public houses. Everything which tends to diminish the cost of a good newspaper would, I believe, operate to increase the number of readers, and more especially of those who would purchase the paper for *family* reading. That the paper duty is not an inconsiderable burden I conclude from this calculation. A full-sized newspaper requires a paper of full 72lbs. weight to the ream, which is about one farthing per sheet. It is found almost impracticable to publish a provincial newspaper of average quality at fourpence, and many which have begun at such a price, have been compelled to increase in order to keep pace with the demands of the age for quality and quantity. The *Cheltenham Free Press* is among that number. The calculation stands thus:—Manufacturer's charge for paper (*exclusive of duty*), three-farthings; allowance to agents, three-farthings; cost of stamp and paper duty, one penny farthing—leaving for the cost of producing the paper, one penny farthing, or the same amount as the Government takes for posting papers (many of which are never posted) and for the tax on the material employed."

The Proprietor of the *Devonport Independent* says, "Yes, to a small extent. The abolition of the duty would doubtless enable newspaper proprietors generally to make some small reduction in their publication prices, and of course reduction in price always tends to increase consumption."

The Proprietor of the *Durham Advertiser* says, "I can scarcely say that the paper duty keeps down the sale of any paper in the north of England. The duty is such a mere fraction in the cost of the paper to the public, that if it were repealed we could not afford to lower the price."

The Proprietor of the *Gateshead Observer* says, "I think not. Were the duty repealed, I do not see that the price of the newspaper could be reduced. The duty forms too small and fractional a portion of the cost to admit of a reduction being made."

The Proprietor of the *Lincolnshire Free Press* says, "In my humble opinion the duty has very little to do with newspapers, unless of immense size and very extensive circulation. Were the duty taken off to-morrow I should not sell an extra paper, nor should I scarcely feel the effect of the repeal. My paper is a double sheet royal (two leaves of *Times* size), and it would require twelve copies to weigh a pound, consequently yielding one-eighth of a penny only on each paper were the duty off, and therefore could not in any way benefit the public, nor myself to any great extent. That on the larger papers with supplements (there are few of these) the repeal might make the cost a halfpenny less is probable; but the sale would not be much promoted by so trifling a reduction."

The Proprietors of the *Newcastle Courant* say, "There can be no reasonable doubt of the affirmative being the case."

The Proprietors of the *Norfolk Chronicle* say, "We should say decidedly not."

The Proprietor of the *Norwich Mercury* says, "I do not think it affects the sale in the slightest degree, for this reason, that the addition per single newspaper the size and weight of the *Times* being about one farthing to the maker, a reduction, if made, would never reach the printer and proprietor. Of course, in smaller newspapers the duty per single copy being less, the probability of reduction is less to the proprietor. Besides, it is proved by almost invariable experience, that as soon as a reduction of duty is probable, the manufacturers raise the price per pound, under the pretence of probable greater demand (without waiting to see the actual effect) or a probable rise in materials; this they are enabled to do most effectually, because the comparatively small number of news manufacturers enable them to agree upon the course they take. To the large newspapers—*Times*, *Illustrated London News*, *Stamford Mercury*, it would give an enormous profit, as they make their own paper, or at least a large portion."

The Proprietor of the *Northampton Herald* says, "The repeal of the duty would not increase the circulation of the *Northampton Herald*, as no reduction in price could be made on account thereof."

Mr. C. D. Collet says, "I doubt it very much; the whole amount on stamped newspapers is only about 50,000*l.*

### 2. Does it absorb capital which would otherwise, in a great measure, be applied to the employment of more talent, and to the supply of a better article to the public?

The PROPRIETOR of *Aris's Birmingham Gazette*, says, "Yes."

The PROPRIETOR of the *Cheltenham Free Press*, says, "The amount of paper required for a full-sized newspaper publishing 1,000 copies weekly, would be 144lbs., a sum which in these days of combination would go far towards rendering remunerative the employment of much more talent, cause the supply of a better article to the public, please more tastes, and procure more readers. The circulation of the English provincial newspapers is about 330,000 per week; allow that some are not full size. The paper duty would be a tax upon these of upwards of 250*l.* per week, or 13,000*l.* per year! —a sum which would purchase for newspapers the copyright of many very valuable works of genius, which would be acceptable to newspaper readers."

The PROPRIETOR of the *Devonport Independent*, says, "The amount of capital sunk in the paper duty by all but some ten or twelve leading prints is too small to materially affect the style in which newspapers (with the few exceptions already referred to), would be brought out. A circulation of 1,000 per week is rather above than below the average of country weekly papers, and the duty on such a circulation as 1,000 per week, averages only 35*l.* per annum; too small a sum to make much improvement in the talent employed."

The PROPRIETOR of the *Durham Advertiser*, says, "I have no hesitation in saying, that if the paper duty were repealed we would employ a greater number and better writers, and consequently would produce a better article. I have always considered the great argument in favour of the repeal of the tax is the benefit it will confer on literary men."

The PROPRIETOR of the *Gateshead Observer*, says, "Yes. If the newspaper proprietor had no duty to pay he could conduct his business with less capital, or employ his capital in the purchase of paper of a better quality, and in the general improvement of his Journal."

The PROPRIETOR of the *Lincolnshire Free Press*, says, "In this respect, as in all taxed articles, where a large stock of paper is kept, as in the stationery and general printing business, I rather infer that about twenty-five per cent. is always lying dormant: in other words, were the paper duty of 1½*d.* per pound repealed, I think that there would be about twenty-five per cent. more capital to work with, so that more speculation might be entered upon; and with an increased demand for literary talent and paper for printing, perhaps a better article would be supplied, and a higher rate of wages paid to workmen by manufacturers of paper, and to literary men by publishers."

The PROPRIETORS of the *Newcastle Courant*, say, "We think it does."

The PROPRIETORS of the *Norfolk Chronicle*, say, "As far as we are concerned we again say, No."

The PROPRIETOR of the *Norwich Mercury*, says, "The amount of capital affected is so small in the average of provincial papers, that I cannot see how the quality of the talent employed could be much affected. For instance, supposing the average of the circulation of provincial papers be 2,000 each weekly, which is not far from the fact, the quantity of capital set loose by the alteration of the duty if the papers were of the size of the *Times*, would not amount to above two guineas a week, or about 8*l.* 8*s.* per month, which is the extent of the supply kept on hand, besides per centage of stamps, being perhaps at an average credit of three months, the difference would be almost imperceptible. The quality and quantity of the talent on a newspaper, supposing the Proprietor to have sufficient capital to work it, will depend more on the character of the Proprietor and Editor than on any other circumstance; and also upon the estimate he puts upon his vocation, and of the value and importance of a well and ably conducted Journal. If he looks upon it as a mere trade by which he is to put so much money into his pocket, he will avoid expense as far as possible, and lend himself to that species of news which is most greedily purchased, and sought after by the masses. If the Proprietor be a person of liberal mind, and if he takes a high view of his profession, he will make a considerable sacrifice of profit to possess himself of the best talent within his reach. But in all cases circulation will depend on population, and on the kind of population as well as upon the number of competing Journals in the district. In a populous manufacturing district the demand will be greater than in such a county as Norfolk, which is almost entirely agricultural, or having a small seafaring population on the coast, and is bounded on the one side by the sea; and whose entire population amounts to not more than Manchester city and its hamlets. Farm labourers do not read newspapers, and the farmers themselves take a paper between two, one passing it to the other at a given time. Norfolk has four newspapers,—*The Norwich Mercury*, which began about 1720, price 4½*d.*; *The Norfolk Chronicle*, which commenced in 1761, price 4½*d.*; *The Norfolk News*, price 3½*d.*, in 1845; and *The Lynn Advertiser*, price 4½*d.* The last began as an unstamped paper about fifteen years since, then went on as stamped once a fortnight; then to a 2*d.* paper, and ultimately, about eight years since (I think), it became a regular newspaper, at 4½*d.* The first three are published at Norwich, and the last at Lynn. The *Mercury* and *Chronicle* are the property of private proprietors: the *Norfolk News* is a Joint Stock Company's property of a certain sect of Dissenters, and has not hitherto paid; the *Lynn Advertiser* is private property, and pays. In the last fifty years a third paper has been started at different periods in Norwich, but they have all failed after a few years, even at the full price; the population and the business of the county not being sufficient to maintain three papers hitherto. The expenses of conducting a paper in the present times have of late much increased, while the largely increased sale of unstamped publications (in reality newspapers though not in name) with the also increased practice of advertising in "Railway Time Table" books, and also annual "Almanack Books," "Compendiums," &c., which are given away by country booksellers, in large numbers continually, although said to be published only once a year, very much affect the number of advertisements in newspapers, which are the main means of the newspaper proprietor."

The PROPRIETOR of the *Northampton Herald* says, "No. In whatever quarter expenditure is necessary it is now incurred in the management of the *Northampton Herald*."

Mr. C. D. COLLET says, "Most undoubtedly."

### 3. Has it affected the independence of newspapers, by unduly increasing the risks attending their publication?

The EDITOR of *Aris's Birmingham Gazette* says, "No."

The PROPRIETOR of the *Cheltenham Free Press* says, "There is no doubt that the present system tends to destroy the possibility of a provincial newspaper being rendered remunerative by the returns from those who should be its supporters, viz., the *readers*. What course a large number of papers might take as to objectionable advertisements were these risks diminished, may be inferred. In many ways it is obvious that the increased risks caused by these and other taxes do render an independent course very difficult with many."

The **Proprietor** of the *Devonport Independent* says, "I do not see that it can in any way affect the independence of any newspaper."

The **Proprietor** of the *Durham Advertiser* says, "So far as my experience goes, not in the slightest degree."

The **Proprietor** of the *Gateshead Observer* says, "Hardly appreciably."

The **Proprietor** of the *Lincolnshire Free Press* says, "In the instance of daily papers, and papers of large size and immense circulation, the duty would in some measure, as a 25 per cent. *£ s. d.* item, affect newspapers; but in the case of the *Lincolnshire Free Press*, I have scarcely cared about the Paper Duty; indeed it has not affected my speculations to any serious amount. I have rarely considered it a grievance not to be borne."

The **Proprietors** of the *Newcastle Courant* say, "Our paper not being a party paper, but devoted to advertisements, commercial, shipping, and agricultural intelligence, and which deals with local, political, and general news, historically, we cannot speak to this question from experience; but from observation, as to other journals, we should be inclined to believe in the affirmative."

The **Proprietors** of the *Norfolk Chronicle* say, "No, not that we are aware."

The **Proprietor** of the *Norwich Mercury* says, "The risks of publication are not affected by the duty, nor is the independence of a journalist. The last is affected more by the law of libel, which, even as modified by Lord Campbell's Act, is still unjust, and subjects the Proprietor to legal difficulties of a most unfair kind. However great his wish to be independent may be, it may be maintained at too great a sacrifice. * * * If the law admitted that to prove a man a thief or a liar, or that the charge as a whole was true, was sufficient, instead of the proof of truth being fettered by legal quibbles, the independence of journalism would be much more secured and strengthened than by any reduction of duty. Speaking generally, I am not of opinion that excellence in newspapers can be attained or is consistent with a low price. Why is it that the *Times* has the finest talent? Because it can afford to pay the highest price. Compel a reduction in its price and its charge for advertisements, and either the profits will cease or fall below what its proprietors consider to be fair, or the best talent will cease to be paid and commanded. If the proprietors of a newspaper wish to have superior talent, with independence of character, and a high-minded appreciation of the duties of a journalist, it must be recompensed highly, and this cannot be done unless the public will pay a fair sum for the paper and for advertisements."

The **Proprietor** of the *Northampton Herald* says, "No risks attributable to the paper duty have been experienced by the *Northampton Herald*."

Mr. C. D. **Collet** says, "I should doubt it; the stamp and advertisement duties are the panniers which weigh down the newspaper. Doubtless the paper duty may be the feather which breaks the donkey's back."

## 4. Please to state any facts relative to the above, or any other points bearing on this inquiry.

The **Editor** of *Aris's Birmingham Gazette* says, "The repeal of the duty on paper would no doubt be an advantage to newspaper proprietors, as it would enable them to expend the amount remitted in 'the employment of more talent and the supplying a better article to the public.' The relief would not, however, be of sufficient amount to warrant any reduction in the price of a single copy of a newspaper, and consequently would not influence the sale. I cannot see any possible way in which the independence of a newspaper can be affected by the paper duty. It is merely a charge on the material used in trade; and whether duty thereon be paid or not, is a question in no way affecting the *independence* of a newspaper."

The **Proprietor** of the *Devonport Independent* says, "As a general rule, all Excise duties are injurious to trade; but I think the paper duty has no superior claim for abolition to several other duties affecting much larger branches of industry. I wish my observations to be understood as referring only to newspapers. I do not pretend to offer any opinion on the bearings of the paper duty with respect to literature in general."

The **Proprietor** of the *Dumfries Courier* cannot answer the "Queries, which do not appear to him to be exactly those which ought to be put. His opinion generally is, that newspaper proprietors made a mistake in 1837, when they fixed the price of their papers: it ought to have been made higher. In his own case he knows that without the profit from advertisements he could not produce the article at 4½*d*. As it is, the paper is sold rather under than above prime cost. He does not, therefore, see why the abolition of the paper duty should or could lead to a lower price; but in many cases, at least, it would doubtless encourage increased expenditure by enlargement, more frequent supplements, and better payment for those engaged as contributors, &c. These remarks apply exclusively to the commercial view of the subject. As to 'independence,' his idea is that real independence cannot be affected by the paper or any other duty, or any consideration whatever, save what appears to be right in itself. In this respect, however, he speaks for himself only, not for others."

The **Proprietor** of the *Gateshead Observer* says, "It is the stamp duty, and not the paper duty, which most potentially restrains the sale of newspapers, and consequently the extended consumption of paper. With a tax of a penny per copy, in addition to the paper duty, it is imperative that the price of the journal shall be high, so as to swamp the impost. Apart from taxation, a new sheet might be published at a halfpenny or a penny, at a profit. Add, however, to the halfpenny or a penny, a penny tax, and the public would not take the article at the price. You must therefore enlarge your sheet and your price until the tax is pretty nearly out of sight. I do not enter into the question whether or not, taking all the circumstances into consideration, the newspaper stamp should be abolished. It has its advantages and disadvantages. On the whole, and on public grounds, I think the duty should be removed."

The **Proprietor** of the *Lincolnshire Free Press* says, "So far as I have considered the matter of the paper duty, I have thought it of little moment in my own individual case, considering the enormous revenue it yields. Yet it must be felt as a serious item to papers like the *Times*, *Illustrated London News*, and others that consume largely of paper; but then look at the enormous profits of these papers. The revenue would not suffer so much by repealing the news stamp. In a word or two, my paper has always been a struggling print through the stamp and the advertisement duty,* not through the paper duty. The penny stamp nearly doubles its price. If I overprint fifty some weeks, I am mulcted of 4*s.* 2*d.* in stamps; but the paper duty on this fifty being only 6*d.*, I scarcely feel it. Admitting that perfect freedom is required for newspapers,—that food *for the mind* should be at least as unrestricted as food for the body,—we do well to aim at the removal of the paper duty. But the repeal of the paper duty alone, so far as it would affect newspapers, would chiefly favour the leviathan class, which generally do well enough as matters now are. The penny stamp is the greatest curse, taxing my sheet *trebly* that of the *Times;* when the stamp is off supplements, then still more; and its worst feature is in being imposed on those actually sold in the districts of publication, few of which ever pass through the post. Let a postage stamp be used, and newspapers would soon be doubled in circulation, while the revenue would be the gainer from postages.

The PROPRIETOR of the *London Mercantile Journal* says, "I have been in business nearly half a century, and never found the price of paper interfere anything like the Advertisement Duty.* As a newspaper printer, I am brought directly into contact with the authorities of the Stamp Office; and although the paper-maker has all that annoyance which the interference of a Government tax imposes, still I do not feel it; and when I go to market, the duty on paper never enters into my calculation, more especially as paper has been falling in price for some time past. The greatest benefit to the journeyman and newspaper proprietor would be the withdrawal of the Stamp-office authorities. Abolish the Advertisement Duty, and stamp only such papers as are wanted for country circulation, and the trade would receive such an impetus, that the demand for paper would be greater than could be produced."

The PROPRIETORS of the *Norfolk Chronicle* say, "We think that if the duty was taken off, it would be a good thing for the printers, but that the public would not gain anything by it, the duty being so small as compared with the price of a full-sized newspaper."

Mr. C. D. COLLET says, "The Paper Duty on the largest newspapers is about a farthing, only a quarter of the Stamp Duty, and the effects of the latter will swallow up those of the former."

## ON COMMON SALT — THE SOURCES FROM WHENCE OBTAINED, AND THE PROCESSES INVOLVED IN ITS MANUFACTURE. WITH OBSERVATIONS ON THE ORIGIN OF SALT AND OTHER SALINE BODIES.

[*Continued from page* 467.]

BY W. BOLLAERT, F.R.G.S.

### AMERICA—*continued.*

PERU.—In the north is the desert track of Sechura; and at Huarmey, in 10° S., the soil is washed for nitrate of potash. At Huacho, in 11° S., there are considerable salinas on the coast, where salt enough is extracted for the consumption of the greater part of Peru and Chile. At Pisco, the southern extremity of the bay, in 14° S., beneath a bed of broken indurated clay and sandstones, a stratum of salt is found, extending from 50 yards to 100 yards from the sea, and sometimes more. This salt contains sulphate of lime, magnesia, &c., and is not considered very good for preserving meat or fish. In the interior, near Cuzco, salt is prepared from brine springs. In the country of the wild Chunchos, near the mountains of Vitoc, there is a stratum of salt, coming from the top of the hill, running S. W. and N. E., a distance of three leagues; it may probably be the continuation of the great salt bed of Maynas. Very many other localities in Peru might be cited; but the province of Tarapaca, in the department of Moquegua, South Peru, 20° S., will be adverted to somewhat in detail, in which country the author, and his old friend and fellow-traveller, Mr. George Smith, had opportunities of examining deposits of salt, nitrate of soda, and other saline bodies, from the sea-shore, to about 15,000 feet in the Andes. During the summer, the south wind blows during the day, but at night it veers towards the Andes; thus the temperature of the air is depressed, dew is formed, but as little of it falls on the land, it will account for the arid and desert character of much of the coast of Peru. It seldom or ever rains in these latitudes. The physical features of the province are—1. Arid porphyritic mountains on the coast, rising sometimes abruptly from 2,000 to 6,000 feet in height, and thirty miles wide, having large hollows and undulations, many covered with salt. 2. The plain of Tamarugal, about 3,500 feet above the sea, thirty miles wide, covered principally with sand, salt, and nitrate of soda. 3. A desert range of mountains, which may be called the base of the Andes, from 7,000 to 8,000 feet high, and twenty miles wide, where much gypsum is found. 4. An elevated district follows, and here for the first time is seen coarse pasture, brushwood, and cacti, vegetation disappearing at about 16,000 feet. 5. We are now in the Andes, in which are many high and colossal mountains. Mr. Smith and myself ascended Tata Jachura, which is 17,000 feet high. Lirima may be 24,000 feet high. In the Andes there are considerable depressions and undulations, giving rise to fresh and salt water lakes; and there is one large salt plain in particular, known as the Pampa de Sal, at an elevation of about 15,000 feet. We have seen that bay salt is produced naturally in North Peru. At Ceremeño, south of Iquique, salt is found in a plain somewhat inland, and from fifty to eighty feet above the sea, which plain has been but recently uplifted from it. On the coast and in the vicinity of sea-shells, this natural bay salt undergoes decomposition, giving rise among other products to carbonate of soda, and chloride of calcium. On leaving the port of Iquique, (at which place there is no water, excepting that distilled from the ocean) for the interior, and having gained the summit of the coast escarpment, much surface salt is met with, looking as if it had oozed out of the earth. The scene is one of absolute sterility. In the hollows and sides of the hills are large superficial collections of salt, and salt mixed with sand, containing chloride of calcium, which is used as a building material at the adjacent silver mines of Huantajaya and Santa Rosa. When the saline matters are free from earthy impurities, they are known as salares, some of which are of great extent, and where there is water near the surface, which generally has run and drained through the great plain to the east. Mr. Smith wrote to the author in 1850, "I have often thought on the origin of the large quantities of salt found on the western side of the great plain, without coming to any conclusion. In some parts it is found to continue for leagues on level plains, on the sides of mountains and at the bottom of deep hollows, like dry lakes or ponds." We now come to the Pampa or plain of Tamarugal. It takes its name from the Tamarugo, a species of mimosa, which grows there wherever water from the ravines to the east reaches the plain. In the same localities there is buried under the soil large collections of dead wood, sometimes called fossil wood. The surface of the plain is strewed with pebbles and sand; then follow salt, nitrate of soda, borate of lime, glauberite, pickeringite, and other saline bodies; marly strata succeed, reposing on beds of rounded stones; and lastly, rocks of trachyte are found. This surface salt is used by the inhabitants, as also in the silver amalgamating works. The nitrate of soda, when purified, is exported, principally to Europe, where it is used in the manufacture of nitric and sulphuric acids, as a fertilizer, and in many operations of the arts. In the times of the old Spaniards, the deposits of nitrate of soda were worked to a limited extent; but about 1830, mainly through the perseverance of Don José Sandes, it was after awhile introduced into Europe. Its price has varied; at present (March, 1853) it is from 19*s.* to 20*s.* per cwt. Since 1830 to 1852, 5,350,000 tons have been exported from Iquique. Mr. Smith, and his partner Dr. José Sandes, (one of the principal firms in the nitrate of soda trade) alone export 30,000 tons annually; and with their projected improvements in the refining process, &c., it is expected that this quantity will be much increased. The nitrate of soda grounds are of great length, but vary in width, the average being 500 yards; in some places it is from seven feet to eight feet thick, and is occasionally quite pure, though it is generally mixed in various proportions with salt. A good average specimen gave, according to Hayes:

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* It should be stated, that the replies to these Queries were received some time back, and before the decision of the House of Commons abolishing the Advertisement Duty.—SEC. SOC. OF ARTS.

| | |
|---|---|
| Nitrate of soda | 64·98 |
| Sulphate of soda | 3·00 |
| Chloride of sodium | 28·69 |
| Iodic salts | 0·63 |
| Shells and marl | 2·60 |
| | 99·90 |

Richard Phillips found the refined nitrate as brought to this country to consist of

| | |
|---|---|
| Nitrate of soda | 97·00 |
| Water | 1·50 |
| Salt | 0·50 |
| Sulphate of soda and insoluble matter | 1·00 |
| | 100·00 |

A refined sample examined by Teschmacker, which came into the market in 1853, was found to be composed of

| | |
|---|---|
| Nitrate of soda | 95·00 |
| Insoluble matters and moisture | 2·60 |
| Sulphates | 0·40 |
| Muriates | 2·00 |
| | 100·00 |

The caliche or nitrate of soda is quarried, put into boilers, water introduced, and the whole boiled. The nitrate is held in solution; whilst the salt, sulphates, and earthy matters, separate. The clear saturated solution is run into shallow troughs and crystallized. The Pampa de Tamarugal contains sufficient nitrate for the consumption of Europe for ages; the desert of Atacama yields it, and it is met with in the Andes and the eastern plains. Underneath the nitrate beds, Mr. Smith has lately quarried a new boracic acid mineral. The following analysis furnished by Mr. Dick, of the Museum of Practical Geology, under the superintendence of Dr. Percy, gives its constituent elements—

| | |
|---|---|
| Water | 27·22 |
| Sulphuric acid | 1·10 |
| Lime | 14·32 |
| Soda | 8·22 |
| Potash | 0·51 |
| Chloride of sodium | 1·65 |
| Sand | 0·32 |
| | 53·34 |
| Boracic acid and nitric acid by loss | 46·66 |
| | 100·00 |

There did not appear to be above 1 per cent. of nitric acid; minute traces of iodine and phosphoric acid were observed. Hayes, of New York, who was one of the first to examine the mineral, gives—

| | |
|---|---|
| Boracic acid | 46·11 |
| Lime | 18·89 |
| Water | 35·00 |
| | 100·00 |

Ulex, of Germany, gives the following of a sample:

| | |
|---|---|
| Boracic acid | 49·5 |
| Lime | 15·7 |
| Soda | 8·8 |
| Water | 26·0 |
| | 100·00 |

Mr. Anderson, of Glasgow, lately procured 47 per cent. boracic acid from a specimen, and observes that it is likely to be of much importance as a source of borax.* Lord de Manley says, that if found in abundance, it will be of essential service in many branches of manufacture; and, speaking of its composition, observes, there is nothing therein to deteriorate its quality as a flux, whilst its white colour, and absence of any metallic oxide, render it equally suitable to the glass crucible and to the potter as a glaze. Small parcels only have as yet arrived in England: these have generally sold for 60*l.* per ton.

Wherever water from the Andes gets into the Pampa of Tamarugal, running often over its surface, and that water not very saline, there a few mimosas grow. Now, we must look to this surface-water as the vehicle which has brought down from great elevations the saline matters found all over the plain. In the south, is the very brackish river of Loa, with salt-streams running into it; on the north there are two other streams, often very salt: these rise in the Andes and run into the sea. With regard to the origin of the nitrate of soda in South Peru, it may be stated that there is little or no organic matter in the desert soil from the Andes to the sea-shore; the whole country has been for ages arid, rocky, sandy, marly, saliferous deserts The nitrogen and oxygen of the air may in some way or other yield nitric acid—ozone, and the chemical rays of the sun, may play a part; still, if we have to look to volcanic sources principally for the formation of salt and other chlorides, why not recur there also for the origin of nitrates, borates, sulphates, iodates, &c.? There are considerable masses of level land in the volcanic Andean regions of South Peru. In one is the great deposit of surface salt, the Pampa de Sal; it is a few miles east of the volcano of Isluga. It was on beholding so large a collection of salt in the elevated position of 15,000 feet, that so strongly impressed the author with the idea that we ought to look for the origin of the greater portion of saline materials to direct volcanic sources. In this way, may we not account for the large quantities of salt in the

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* Vide "Jury Reports of the Great Exhibition," p. 524.

Andes of Chili, Peru, Mexico, and in the United States, as also in the more elevated parts of Europe, Asia, and Africa? Then, the melting of snows and rains would wash much of this soluble material into the sea; and, without entering here into the question, as to the changes in organic matter that may have been going on from the period when the ocean had its commencement—for, according to what the author has intimated, the saline contents of the sea ought to be on the increase—let us start from the period when our planet commenced a separate existence. The cooling of the crust of the globe would now take place, enveloped in the gaseous elements, principally of oxygen, hydrogen, and nitrogen. A portion of the oxygen and hydrogen would combine *chemically* to produce water—another portion *mechanically* to form the atmosphere. Thus, then, in the beginning, the waters would form a *fresh-water ocean;* organic matter would be peculiar to it; but, governed by the change from a fresh-water character to that of it becoming saline, not containing at present as much as 4 per cent. of solid matter. Halley, the astronomer, supposed that the ocean derived its saltness from the land by means of rains; and he observes, "If the increment of salt could be found for any given number of years or ages, we should then be able to work backward by the rule of proportion, and discover the time when the sea began to grow salt;" and which might also lead, comparatively, to a knowledge of the age of our planet.

With reference to the Author's observations, and those of others, he will conclude with the following *resumé* as to the origin and sources of salt, adverting only to the more salient points.

I. Bay salt is deposited by solar evaporation from sea water.

II. Another variety of bay, or rather sea salt, is procured from sea water, by allowing it to run into shallow reservoirs on the surface of the ground. Here it is partially evaporated by the sun's heat, and then by artificial means; a purer chloride of sodium is thus obtained, in consequence of the separation of the "bittern" from it.

III. Another and harder species of bay salt is occasionally deposited near the level of the ocean, and a few feet about it, as on the coast of Peru: here it has been recently uplifted above the sea.

IV. Salt is produced in Russia by freezing sea water and evaporating the brine. Another effect of low temperature is to decompose a portion of salt, and of converting the sulphate of magnesia of the brine into sulphate of soda and chloride of magnesium. The formation of sulphate of soda in this way may be one of the causes in the production of glauberite in Peru, and other places: that is to say, the saline lakes in the Andes and other frigid mountainous countries, would, particularly in winter, be reduced to a very low temperature; then the chemical, as well as other changes, would be produced.

V. Salt, having risen with the vapour of water, or with the spray of the ocean, or from inland salt lakes, and there deposited.

VI. Rock, or fossil salt, is found constituting portions of mountain ranges nearly all over the world. From the small per centage of saline matter in sea water (not 4 per cent.), we can hardly look to the ocean as the origin of so much *nearly pure chloride of sodium*, but rather to sources of a volcanic character, produced at various epochs, and under varying circumstances. During volcanic eruptions with vast quantities of sulphur, muriatic acid escapes, and salt has been found sublimed about craters. Sea water may find its way into the igneous interior of the earth; the heated water and steam may play an important part in assisting chemical operations. However, the two elements in the production of salt are chlorine and sodium.

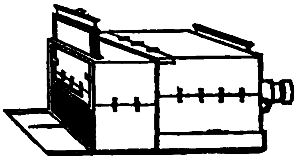
VII. Saline lakes found at all elevations, and in the case of the Dead Sea, below the level of the ocean. Water formed by the melting of snows and rains would dissolve the salt found in higher positions, washing it down into hollows; when these waters became saturated they would deposit salt, and in summer some would dry up, leaving a cake of the substance.

VIII. Brine springs met with everywhere, such being formed by water percolating the earth, then coming into contact with depositions of salt, producing springs, lakes, and streams, from which the saline matters are found in some cases, to remain in hollows and plains, forming large tracts of surface salt sometimes but erroneously called rock salt.

IX. Saline bodies, formed by the decomposition of volcanic and other rocks. The albites, or soda granites, are common in the "New World," the red granites yielding potash, as in India;—such decompositions would go on at all elevations, and by the aid of water the soluble parts would find their way into lower levels, and ultimately into the great basin of the ocean.

## A NEW FOLDING CAMERA.

A new form of folding camera has just been registered by Mr. Ottewill. It combines the sliding and folding principle. It is composed of two folding bodies, the one sliding within the other, the outer one folding over the inner one when packed up. The inner one, when in use, is made firm and rigid by the insertion of a narrow frame sliding into the front. The whole packs into a very small compass, in a leather case, and is remarkable for the simplicity with which the two principles are combined. The accompanying wood-cut sufficiently explains the construction. Great portability is obtained with the requisite strength, firmness, and efficiency.



## HOME CORRESPONDENCE.

### PATENTS.

Sir,—When the letter signed "Cosmos" appeared in this Journal, some three or four months ago, I was asked to write an answer to it; and I remember that that gentleman did me the honour to notice what I had said on the subject of patents when I explained my new lock to the Society, with the remark that I evidently did not understand the principles of the patent laws; which he then proceeded to expound himself, historically and philosophically, beginning somewhere about the time of Tubal Cain, and introducing an episode about James Watt and the steam-engine, but forgetting that much more material and awkward fact for his argument, that if Watt had not also been lucky enough to hit upon the clumsy expedient of the sun-and-planet-wheel motion, for the purpose of evading a patent which had just before snapped up the monopoly of the crank, he would not have been able to make steam-engines of any use without first satisfying the exorbitant demands of the monopolist of the crank; and those demands, be it remembered, would be proportioned not to the value of the crank at the time it was invented, but to the new value which it immediately acquired by Watt's own invention.

I only mention this *obiter*, as I shall probably have to advert to it again among the other unjust effects of patents afterwards; and that is all I intend to say about Cosmos's letter—partly because I remember nothing more of it than that there was very little in it worth remembering, and further, because I have never any disposition to discuss anything with anonymous disputants, who can say what they like without any risk of exposure; and the reason why I return to the subject now is, that I have been again asked to do so, in consequence of the discussion being reopened in the Journal of the week before last, and because I have now some time to spare, which I had not three months ago. On the other hand, however, I have the disadvantage now of having no books to refer to, and of being in a place where I have very little chance of getting any that would be of use.

As I am going to advocate the abolition of patents, or at least a preliminary measure with a view to it, let me say at once that I am very glad this Society (for I suppose it was in a great measure their doing) succeeded in getting patents made cheaper—First, because, if inventors have the natural right (which all patent laws assume) to prevent anybody else from inventing the same thing, or at least from using their invention if they do, then there can be no decent excuse for making them pay several hundred pounds for the piece of parchment, without which they cannot even go into battle in Westminster Hall to defend this natural right. I say no decent excuse, for the standard and stock excuse which used always to be made for dear patents, was really suicidal and subversive of the theory of patents altogether, viz., that if they were too cheap, they would become so common as to be inconvenient and obstructive to the progress of science: as if it could be too common for men to be allowed to defend their natural rights without paying 300*l*. or 400*l*. for "deputy-chaff-waxes," and that sort of official rubbish.

Secondly, I am glad that patents have been made cheap, because I have no doubt they *will* become so common as to be too manifestly inconvenient and obstructive to the progress of science, to be allowed to remain many years unabolished and unconsigned to the great limbo to which all protectionism seems doomed. I remember Mr. Brunel, no bad judge, I should think, making this remark aside to me in the chair of the Society, one night when somebody was congratulating them on having opened to inventors the millennium of cheap patents. Already, I believe, they have got to be reckoned by thousands in a year; and therefore I am not sure that it would not be the best plan for their opponents to do nothing to discourage inventors from getting patents as many and as frivolous as possible, but for one practical suggestion, which I think is worth attending to without delay. I mean that in every patent granted henceforth, there ought to be inserted a clause, similar to that which is inserted in all railway acts, and in appointments to various offices, viz., that the company, the salary, or the patent, shall be held subject to any future legislation on the subject. If the opponents of patents are wrong, and the public continues to admire patents, the patentees will not suffer by the clause. If, on the other hand, it is found expedient, after a few years' more experience, to stop the granting of patents, it will be a serious evil to have a good many thousand of the patents, which are now growing as fast as mushrooms, still outstanding and incapable of being abolished, as Parliament neither will abolish them without compensation, nor can possibly give any compensation for them. With this view, therefore, I think it is not premature to direct attention to the question of the expediency, and the ultimate probability of abolishing patents; though I am quite aware that there is no probability of that event happening until the public has had several years' experience of the advantages of cheap patents; I may add, until they have had some time to recover from the startling effect which the promulgation of the doctrine of no patents has upon most people when they first hear it.

I confess it had that effect on me. Almost the first person from whom I heard it was Sir William Reid, who told me that as Chairman of the Executive Committee of the Exhibition, he had been asked by a distinguished member of the Society to read a number of papers in favour of cheap patents, and that he had read and returned them with the answer, that they had convinced him, to his own surprise, that there ought to be no patents at all. It is well known that many other persons of eminence and experience (though Cosmos and the patent agents probably consider them all incapable of understanding the first principles of patents), have settled down into the same conviction, some from one set of reasons and some from another. The reasons which appear to me to lead to that conclusion I will now explain as well as I can.

I said that all patent laws, or their defenders, assume that an inventor has a *natural right* to prevent anybody else from using the same invention, who may have, either subsequently or simultaneously, or even previously (if he has not published it), invented it himself, quite independently, or made some improvement in it not sufficiently different to be held by an intelligent British jury, with the aid of the invariable conflict of scientific evidence, to be a distinct invention: and I do not suppose that any advocate of patents would be inclined to abandon that position, which is certainly their strongest, though in the extremity of argument they are sometimes driven to resort to others, which I shall not forget to deal with. But first let us consider this "natural right" view of the case; of which we may remark by the way, that patents for inventions were not originally established on any such ground, but were a relic saved from that system of granting monopolies for the sale of everything which had become one of the national grievances two or three hundred years ago.

Another incidental remark we may make upon it is, that if inventors have a natural right to a monopoly of their own inventions, as many persons say they have, just as much to their own fields, or the goods in their own shops, which the law protects for them, the law has really been very unjust to them, as it secures them only fourteen years' enjoyment, with a chance of seven years more if they can persuade the Privy Council that they have not made money enough out of it in the fourteen years. The *minimum* period of copyright is just three times as long, and it may be much longer, and there have been considerable advocates for a perpetuity of copyright; but I never heard of any one venturing to propose a perpetuity of patent right. As I have mentioned copyright, and at first sight the analogy between them appears striking, I will dispose of that point at once. I was surprised to see that none of the witnesses before the Patent Committee did so, though the analogy was several times alluded to. Copyright does not prevent anybody from writing every word that he could have written if there had been no copyright, for the obvious reason that no two persons could have written the same thing independently. It does not even prevent two people translating the same foreign book, provided the Court is satisfied (and luckily that has to be decided by a Judge, and not a Jury), that the second version really is a translation of the book, and not a copy of the former translation. Much less does copyright prevent anybody from writing a better book on the same subject than any existing one, though it may contain everything that the existing one contains, provided again it is not obviously copied from it. But the complaint against patents is, that they do interfere with *bonâ fide* inventors and improvers, and so obstruct instead of assisting the progress of science, as was remarked by the Jury on Philosophical Instruments in the Great Exhibition, in their Report, although I know that the chairman of that Jury had been a strong advocate for making patents as cheap, and therefore as numerous, as possible.*

The patent man will probably say, it may be true that every now and then a patent may interfere with a subsequent or a contemporaneous *bonâ fide* inventor of the same thing, or even a better thing slightly different; but that is no reason why I should not enjoy the protection I am entitled to; and if you say it is unfair in me to interfere with other inventors, it is at least as unfair to allow mere copiers, who are no inventors at all, to avail themselves of my invention without paying for it. But I say that *is* a reason why he should not enjoy the protection he says he is entitled to. The public has a right to say to such a man, if you cannot invent a law by which you can have the protection you say you are entitled to without running the risk of interfering with other people who, if you were out of the way, might have invented the same thing and perhaps a better thing, you must be content to remain without protection, and it is not worth while to discuss the question, whether you would have any right to it if you could have it without injury to other people, or inconvenience to the public whom you ask to interfere and make a law for your benefit.

But is there any such right? It is very easy of course to say there is; and just as easy to deny it; and as one may be paired off against the other, on which side does the *onus probandi* lie? Clearly on the side of those who require the interference of the law for their protection. The way it is usually put by them is this: it is very hard that a man should spend his time and money in making experiments in order to work out an important invention, and then, as soon as he has produced it, find it taken out of his hands by some rich manufacturer who can reap all the profits which ought to belong to the inventor. Now as it is no use arguing without the least chance of convincing anybody, I am not going to deny that that is a hard case, or that it would be desirable, if you can without doing greater mischief, to interfere in some way for the protection or compensation of meritorious inventors under these circumstances; and before I finish I shall have a word to say on that subject. But remembering the very true saying of a famous judge, that "hard cases make bad law," I repeat that this, like many other hardships, must be endured so long as those who suffer them cannot find out any remedy except one which will only turn the injustice from themselves on to somebody else, and at the same time interfere with the general good. But I say further, that this kind of hardship is enormously exaggerated. Painful men working out important inventions at vast expense of time and money, are *not* the common case of inventors by any means: very much the contrary. Far the largest number of really useful inventions are made without any considerable expenditure of either of those things. The people who most frequently consume their lives in this way are that proverbially unfortunate class of mere inventors who are lured away from their own proper business (if they have any) by delusive hopes of making a fortune by a patent; generally very ignorant of scientific principles, and (as I said a few weeks ago) often resenting any attempt to enlighten their ignorance. If the abolition of patents diminished this class of inventors I should think nobody will deny that it would be more a matter for rejoicing than for regret.

I said the majority of inventions are made without any great expenditure of time or money. It is notorious that not a few of the most important have been made by accident; some even by mistake. There is a physician from America now making his fortune in London, by a discovery of a specific for a large and fatal class of diseases, which he made by a mistake, having accidentally applied one thing instead of another to a case of that disease. Nobody of course can grudge him the fortune he makes, because he is benefiting mankind as well as himself; and yet nobody can say that he has earned it by the expenditure of time, money, thought, or science, in arriving at the discovery. It is easy to see that a vast number of chemical, if not mechanical discoveries, or inventions, may be made by accident, or in a moment; and chemical inventions are every day becoming more important than mechanical ones. And even when they are made, after spending a good deal of time on them, remember that the time is really spent on the failure, or on the unsuccessful attempts, not on the invention itself, which is generally, at last, the work of a moment; or what one may poetically call a flash of inspiration. A sufficiently skilful man would have hit upon the right thing at once; and I know of no other case in which a man is entitled to ask for compensation for the time which he has spent in *not* doing what is wanted.

And therefore, although it may seem a startling proposition, I go at once to the bottom of the claim for protection of inventors, on the ground that they may have spent a great deal of time and money in arriving at their invention, by denying that that is a ground for the interference of the law on their behalf: in other words, I deny the natural or moral right of an inventor to stop the inventions, or the improvements, or the works of other people, in order that he may have the opportunity of making a large fortune by the result of a single piece of skill,—a single new application of science, perhaps a very slight step in advance of what has been done before; perhaps no advance at all; a single piece of lucky observation, accident, or mistake; or even the result of a long course of unprofitable and unsuccessful experiments, at last ending in the right one. And here I must stop for this week, remaining

Your's faithfully,
E. B. DENISON.

Ben Rhydding, Leeds, 16th August, 1853.

## PARLIAMENTARY PAPERS.

Fordingbridge, Aug. 10th, 1853.

SIR,—My attention has been called to an article in your Number of July 29th, on the subject of Parliamentary Papers.

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* I should mention, that though I was nominally a member of that Jury (X), I did not act upon it, finding the business of the Class X *b*, which was carved out of it, and of which I was chairman, quite as much as I could attend to.

Having from the first entertained a very strong opinion as to the desirability of making selections from their public property, in the widest and fullest sense of the term, through the medium of our Mechanics' Institute Libraries, I greatly rejoice to observe the disposition evinced by the Committee of the House of Commons to meet our wishes.

It occurs to me at the present stage of the question that it would be well for the Society of Arts to classify Institutions with reference to this subject, that we may come at something like the precise nature of their different requirements.

As is well remarked in the report of the committee, all Institutions do not require, and could not value all the reports. Let then the Society propose the Query to each Institute: Which of these three classes of reports would be useful and acceptable to your members; those relating to manufactures, agriculture, or maritime pursuits? Perhaps a fourth and most important class may be named, which would be eagerly accepted by all; those, viz., relating to the sanitary and educational condition of home and the colonies.

The replies to these Queries would elicit much information on the subject, and would probably form a guide to the Society in their further endeavours with reference to it.

I am, Sir, your obedient Servant,

W. F. Chubb.

## MISCELLANEA.

**Proposed Mercantile and Maritime College in the City of London.**—The *Bankers' Circular*, in writing on this subject, says, "that the object which the projectors of a Mercantile and Maritime College have in view is, not to make it an educational establishment for youth, but so to arrange its several departments, as to bring together into one focus a complete combination of theoretical and practical information bearing upon mercantile and maritime affairs. If we enter into the details of these two departments, we shall find that the separate branches open a wide field for national enterprise. If we take each of them separately, it is probable that it may be said that we have the means of acquiring a knowledge of them in establishments already devoted to such purposes. But upon a closer examination we shall find that such is not the case. We have our universities, our private colleges, our proprietary and our private schools—we have also our museums, our literary societies and public lecture-rooms; but in these we find such a want of unity of purpose, that they cannot supply the information which it is proposed to do by the establishment of a Mercantile and Maritime College."

**Jacquard Loom.**—Two nieces of Jacquard, the well-known inventor of the loom which bears his name, have been compelled, by poverty, to offer for sale the Gold Medal bestowed by Louis XVIII. on their uncle. The sum asked was simply the intrinsic value of the gold, 20*l.* The Chamber of Commerce of Lyons, becoming acquainted with the circumstance, agreed to become the purchasers of it for 24*l.* "Such," says a French Journal (*Cosmos*), "is the gratitude of the manufacturing interest of Lyons for a man to whom it owes so large a portion of its splendour."

**The American Exhibition.**—The New York correspondent of the *Times*, in his letter dated "July 23rd," a week after the opening, writes that "there are two American inventions which are likely to affect to some considerable extent the fortunes of mankind. I speak first of an entirely new thrashing-machine, which, with a four-horse power, will thrash, clean from smut, winnow, measure and bag from 1,000 to 2,000 bushels of any kind of grain or seed (except maize or Indian corn) per day. It is a far greater invention than M'Cormick's reaper, and is likely to attract great attention. The second is a new printing press, which prints from uncut paper, rolling from a cylinder, and cuts and folds with perfect regularity 30,000 copies per hour. There is no counteraction in the process, and, consequently, no time lost in returning motion. Both sides are printed at the same time, and 30,000 per hour is a low estimate, since, by increasing the speed, they can be printed as fast as paper or cloth can be unrolled from a cylinder. The inventor declares that he can print one mile of newspaper as fast as a locomotive can run on a railway. With perfect machinery and arrangements he may do it. His present experiments demonstrate a practical principle, and the invention is looked upon with wonder and delight."

**Clarkson's Life boat.**—This boat is composed of sheet cork, canvas, and thin wood, alternately combined by some adhesive substance. She is 28 feet long, 7 feet 6 inches beam, 2 feet 7 inches deep, and 2 feet 4 inches sheer of gunwale. It weighs 23 cwt. including ballast, being, it is said, from 15 cwt. to 17 cwt. less than either Capt. Washington's or Mr. Peeke's new life boats, of the same dimensions. There are raised air cases at each end, which detach in case of need, and can give buoyancy to 150 persons. This boat was recently tried at the Royal Dockyard, Woolwich, when twenty-eight men were placed in her, and though the delivery tubes were open for the free access of water, yet the lowest part of the gunwale was twelve inches above the water.

**Industrial Instruction.**—The Dean of Hereford and Dr. Henry, of Haffield, offer the following prizes to be competed for by the Masters of Elementary Schools for the Industrial Classes in the County of Hereford,—of 5*l.*, 3*l.*, and 2*l.*, to be given to those who pass the best examination in what has been termed "the Science of Common Things," the examination in writing and *vivâ voce* to take place in Hereford during the Harvest Holidays of 1854. A prize of 1*l.* to the pupil teacher or candidate in his last year, or whose apprenticeship is just expired, who passes the best examination in the same subjects. Also prizes of 3*l.*, 2*l.*, and 1*l.*, to be given to the Artizan class of the Hereford Elementary Drawing School, and for which the Schoolmasters included in the foregoing may compete. All the prizes to be given in books. It is intended to print an outline of the subjects with reference to books, which will be sent to those who think of being candidates, in order that they may have a more definite idea of what is meant: this will, at the same time, suggest subjects for study in which every good schoolmaster ought to be informed, and without a knowledge of which he can scarcely be thought equal to the wants of the present day.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 11th August*, 1853.

713. Post-Office Receiving-Houses, &c.—Abstract of Return.
803. Dockyard Appointments, on Case of Lieut. Engledue—Report from Committee.
823. Merchant Seamen's Fund—Copies of Letters.
857. Caledonian Canal—Forty-eighth Report of the Commissioners.
657. Bills—Fisheries (Ireland), No. 2.
900. ,, —Corrupt Practices at Elections.
802. ,, —Summary Jurisdiction (Ireland).

*Delivered on 12th August.*

834. Metropolitan Commission of Sewers—Return.
839. Greenwich Hospital Schools—Annual Report.
848. Clitheroe Election—Report from Committee.
901. Bill—Petty Sessions (Ireland).

*Delivered on 13th August.*

748. The Ship "Novello"—Report from the Committee.
912. Bills—Registrar of the Privy Council.
913. ,, —Liberated Africans (Sierra Leone).
914. ,, —Passengers' Act Amendment.

*Delivered on 15th August.*

661(1). Berwick-upon-Tweed Election—Index to Minutes of Evidence.
788(1). Queen Charlotte's Island—Copy of Correspondence.
851. Decimal Coinage—Report from Committee.
924. Criminal Code (Malta)—Return.
541. Metropolitan Commission of Sewers—Plans.
867. National Gallery—Report from Committee.

868. Clitheroe Election—Minutes of Evidence.
910. Bills—Burgh Boundaries (Scotland).
915. „ —Militia Pay.

*Delivered on 16th August.*

898. Peterborough Election Petitions—Report from Committee.
645. Calicoes, &c.—Return.
849. Omagh Nunnery School—Return.
922. Bill—Government of India (Lords' Amendment).
Russia—Correspondence.
China—Order in Council.
China—Papers relating to the Civil War.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 12th August, 1853.*

*Dated 26th April, 1853.*

1000. J. C. Haddan, Chelsea—Cartridges and wadding.

*Dated 21st May.*

1260. H. J. Scoutetten, Metz—Plastic compound for ornaments.

*Dated 6th June.*

1388. J. W. Friend, Canute-road, Southampton—Measuring distance run by ships, &c.

*Dated 7th June.*

1399. A. M'Dougall, Manchester—Soda and potash.

*Dated 17th June.*

1480. J. Hogg, jun., Nicholson-street, Edinburgh—Application and combination of glass, porcelain, &c., of the kind called Scagliola and Majolica ware.

*Dated 14th July.*

1672. W. Henderson, Bow-common—Furnaces for smelting.

*Dated 18th July.*

1708. P. A. L. C. de Fontainemoreau, 4, South-street, Finsbury—Equilibrating weight of atmospheres. (A communication.)

*Dated 25th July.*

1742. J. B. Howell, Sheffield, and W. Jamieson, Ashton-under-Lyne—Saws.

*Dated 26th July.*

1753. J. Dawson, Linlithgow—Preventing fraud in drawing off liquids.

*Dated 27th July.*

1765. J. Knowles, Manchester—Looms.
1767. A. L. du T. de Beaujeu, Paris—Rotatory engines.

*Dated 28th July.*

1769. C. Cummins, 148, Leadenhall-street—Clock escapements.
1771. T. Forster, Streatham—Boots and shoes.

*Dated 29th July.*

1773. T. Dethier, Pimlico—Mortising, drilling, and boring machine.
1774. G. Jarrett, London—Stamping or printing coloured surfaces.
1775. J. E. M'Connell, Wolverhampton—Marine steam-engines and boilers.
1776. J. Mackay, Aigburth, near Liverpool—Propelling vessels.
1777. W. E. Newton, 66, Chancery-lane—Depositing metals.
1778. W. Wild, Salford—Machinery for covering rollers used in manufacture of cotton, &c., with leather, &c.

*Dated 30th July.*

1779. W. T. Henley, St. John-street Road—Protecting telegraph wires.
1780. G. K. Douglas, Chester—Permanent way.
1781. W. W. Cook, Bolton—Woven fabrics, and machinery for same.
1782. G. Ambler, Settle, West Riding, Yorkshire—Machinery for preparing for spinning cotton, &c.
1783. P. Ramsay, Glasgow—Construction of tents.
1785. P. A. L. C. de Fontainemoreau, 4, South-street, Finsbury—Mode of producing electric current. (A communication.)

*Dated 1st August.*

1786. J. Buchanan, Leamington Priors—Propelling.
1787. H. Cadell, Dalkeith—Reaping-machine.
1790. J. Gray, Rotherhithe—Consuming smoke.
1791. P. and F. Schäfer, Brewer-street, London—Travelling bag
1792. J. P. Tracy, Salisbury, and J. H. Tracy, Old-street, London—Cutting, reaping, and gathering machine.
1793. J. S. Perring, Bury, Lancashire—Permanent way.
1795. A. R. Pope, Massachusetts—Electro-magnetic alarm apparatus.
1796. R. Griffiths, 69, Mornington-road, Regent's-park—Rivets and bolts.
1797. C. May, Great George-street, Westminster—Manufacture of bricks.
1798. R. Holme, Kingston-on-Hull—Gas.
1799. H. P. Vaile, Claydon Farm, Ashchurch, Tewkesbury—Reaping machinery.

*Dated 2nd August.*

1800. J. Bothams, Gravesend—Wheel-tyres for locomotives.
1802. W. Perks, jun., Birmingham—Tap for drawing off liquids.
1806. P. A. L. C. de Fontainemoreau, 4, South-street, Finsbury—Regulating electric light.

### APPLICATION WITH COMPLETE SPECIFICATION FILED.

C. F. Stansbury, Pall-mall—Machinery for tempering clay, and forming it into bricks. (A communication), 3rd August, 1853.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 12th August, 1853.*

378. Charles Hadley, of Lower Hurst-street, Birmingham—Improvements in the means of communication between the passengers, guard, and driver of a railway train, parts of which improvements are applicable to communicating on vessels.
382. Peter Armand le Comte de Fontainemoreau, of 4, South-street, Finsbury—Improvements in the mode of giving flexibility to beds, sofas, seats, and other similar articles. (A communication.)
385. Francis Clark Mouatis, of 4, South-street, Finsbury—Invention of an improved mode of raising water.
387. William Clark, of 31, Chancery-lane—Improvements in the manufacture of colour and paints. (A communication.)
1504. William Hodgson and Henry Hodgson, of Bradford, York—Improvements in machinery for spinning wool, hair, silk, flax, and other fibrous substances.

*Sealed 15th August.*

393. George Stiff, of Brixton-hill, Surrey—Improvements in manufacturing paper.

*Sealed 16th August.*

413. James Murphy, of Newport, Monmouthshire—Improvements in the permanent way of railways.
426. William Darling, of Glasgow—Improvements in the manufacture of malleable iron, and other metals.
455. John Smith, of Uxbridge—Improvements in machinery for raising and forcing water and other fluids.
462. Adam Cyrus Eugert, of Mora-place, City-road—Improvements in joints for the sticks of parasols, and other like purposes. (A communication )
514. John McAdams, Massachusetts, U. S.—Improvements in machinery or apparatus for printing on leaves of books their designations, numbers, or devices, or those of their pages, which machinery or apparatus may also be used to advantage for printing, designating numbers or devices on various other articles.
824. James Jerram Platt, of Long Eaton, Derby—Improvements in stockings.
1463. James William Gibson, of 120, Long Acre—Invention of a new method of pavement, tending to secure the evenness of the road and proper adhesion to the [illegible]
1465. Joseph Ilsley, of Lisbon—Invention of improved telegraphic apparatus.
1497. Samuel Schofield, of Oldham—Improvements in machinery or apparatus for preparing and spinning cotton and other fibrous materials.
1551. Alfred Sandoz, of Ponts, Switzerland—Invention of an instrument or apparatus which he terms a "[illegible] watch." (A communication.)
1589. John Jacques, junior, of Hatton-garden—Improvements in the manufacture of chess-boards and chess-men

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| August 11 | 3498 | Portable Reclining Chair | James Ross Murphy and Patrick Murphy, trading under the name or style of E. Ross | Dublin. |

# SOCIETY OF ARTS.

**FRIDAY, AUGUST 26th, 1853.**

## NOTICE TO INSTITUTIONS.

The Council have much pleasure in announcing that Thomas Sopwith, Esq., F.R.S., F.G.S., has placed at their disposal fifty copies of his "Lecture on Education;" fifty copies of a small tract "On Benefit Societies;" twenty copies of "A Tract on Friendly Societies, the *bonâ fide* production of four Miners in Allendale;" and ten copies of a pamphlet "On Mining Records;" for distribution to the Institutions in Union. As the number of these works is less than the number of Institutions in Union, it is requested that special applications may be made, which will be registered in the order of their receipt, and the books will be sent out in the next parcel.

## SUBSTITUTE FOR GUTTA PERCHA.

The short notice inserted in the Journal a few weeks since on this subject having attracted considerable attention, and caused many inquiries to be made, it is thought desirable to print the following article, extracted from the Journal of the Agricultural and Horticultural Society of India, recently received from Calcutta by this Society:

"*On the Juice of the Muddar, as a Substitute for Gutta Percha.—Communicated by Capt. Meadows Taylor.*

"My Dear Sir,—I observe in the last Number of the Society's Transactions that the Muddar, *Asclepia gigantea*, affords a very valuable kind of hemp or flax; and I have now the pleasure to communicate to you another valuable property it possesses, which has been lately discovered by a friend here, under whose permission I make the present communication to you.

"Dr. Riddell, the officiating superintending surgeon of the Nizam's army, had for some time been employed in extracting, or determining, by chemical experiments, the well-known medicinal properties of this plant, and during his investigations having had occasion to collect the milky juice or sap and expose it to the air, found, as it gradually dried, that it became tough and hard, and not unlike gutta percha. This induced him to treat the juice as that of the gutta percha tree is done, and the result has been the obtaining of a substance apparently precisely analogous to gutta percha, of which I have the pleasure to send you a specimen bearing the impression of his seal, marked No. 1. The mode of preparing this substance is as follows:—The juice or sap to be collected by incision. An open slit may be made in the back of the plant, and a pot tied to it, when it will flow into it; or it may be collected by cutting the back and catching as much as flows out at once. Dr. Riddell calculates that ten average-sized plants or bushes will yield as much juice as will make a pound of 'gutta percha' substance; but it is not known yet how far the plant will bear tapping without injury, nor how often, or at what intervals, the extraction of juice might be made. The juice extracted may either be exposed to the sun in a shallow vessel, or left to dry in the shade: by the former process the substance becomes a little darker than by the latter. When it has attained a tough consistency, it may be well worked up in very hot water with a wooden kneader, or boiled; either process serves to remove an acrid property of the juice, as also all other matter but the 'gutta percha' itself. It is believed that the more it is boiled and worked up, the harder it will eventually become when cool.

"Comparison with the true gutta percha gives the following results:—Sulphuric acid chars it; nitric acid converts it into a yellow resinous substance; muriatic acid has very little effect on it; acetic acid has no effect; alcohol ditto; spirit of turpentine dissolves it into a viscid glue, which, when taken up between the finger and thumb, pressed together and then separated, shows numberless minute and separate threads.

"The above chemical tests correspond exactly with the established results of the real gutta percha.

"The substance, however hard it may have become, becomes immediately flexible in hot water, and readily takes any form required, receiving and retaining impressions of seals, ornaments, &c. It has been made into small cups and other vessels, which are not found to alter in form. A test I suggested myself was, would it unite with gutta percha? and this was satisfactorily proved in my presence. A piece of the real gutta percha, of similar size with a piece of the new substance, was softened in hot water, and united readily; a specimen of this mixture is sent, marked No. 2. The tests by acids on the mixed substance did not differ from those on either of the two original substances. As there is no trouble attending the manufacture, and as I have no doubt the plant may be had near Calcutta, I have not sent more than a small specimen of that prepared by Dr. Riddell; and have no doubt that you, if you consider the subject worthy of attention, which it strikes me it is in an eminent degree, can readily prepare some of the new substance for any further experiments, chemical or otherwise, which you may consider necessary. If the muddar could be profitably grown for its hemp alone, it is evident, if this new substance proves in practice what it now appears to be, that an acre of cultivation of it would produce a large quantity of juice, and thus materially enhance its value. The poorest land suffices for its growth, but I have no doubt that if cultivated and plentifully irrigated, not only would the yield of juice be larger, but the growth of the plant, and the fineness of its fibre when made into hemp, materially increased.

"Believe me, &c.,

"Meadows Taylor.

"Hyderabad, 2nd November, 1852."

### SUBSTITUTE FOR GUTTA PERCHA.

(*From the Bombay Times of November 4th*, 1852.)

**The following is a very interesting extract from a note from Dr. Riddell, containing an account of the experiments made by him on a substitute for gutta percha, which he believes he has discovered. The subject is most important, and if we can make a common hedge**

plant yield a product so valuable, and the demand for which is so certain quickly to outrun supply, a material addition will have been made to the productive resources of the country :

"I have now the pleasure of sending you the results of my experiments on the juice of muddar, and which I think will be found to assimilate closely with all the properties of gutta percha. A nearly similar substance is procurable from the juice of the milk bush or hedge, as it is called, the *Euphorbia tirucalli*, only when it hardens after boiling it becomes brittle; whilst warm it is as ductile as the other and becomes hard quicker, without any of the peculiar scent of the *Asclepia gigantea* juice; it readily dissolves in spirits of turpentine, but is not affected in alcohol. As the juice is very acrid, and blisters the skin, giving most excruciating torture if the slightest particle gets into the eye, care must be taken in collecting it; however, a machine could easily be made for chopping up the boughs and expressing the juice, so that it need never be touched by the hands. The juice of that elegant plant of the same species, the *Poinsettia*, which has such a beautiful effect in the garden when the leaves turn scarlet, gives a similar substance, but does not harden when cool as the other, but still firm enough to be twisted, and would make a good varnish in a solvent like turpentine and then mixed with spirit. The plant grows readily from cuttings, but requires water, which the other two do not. As regards my experiments with the muddar juice, they are as follows :—Having collected about 18 fluid ounces, I had it strained through a cloth, and exposed 13½ ounces of it to solar evaporation on a flat dish. In three days it became firm, separating itself from the dish and easily removed. I then placed it in boiling water, and worked it well about with a spatula, and when cool enough to handle, kneaded it with my finger; when cool, I found it to weigh a little more than 6 ounces. I then boiled it, and, as it cooled, worked it well again; and on weighing the substance found it had lost 1 ounce. It was then pulled out into shreds and boiled a second time, kneading it whilst cooling, and 4 ounces 2 drachms apothecaries' weight was obtained of what I call muddar gutta percha. The next experiment was with 4 ounces of the juice, which weighed 4 ounces apothecaries' weight; placing it in a basin, I poured about one quart of boiling water on it, stirring it up and then leaving it to stand, when it broke into curds and fell to the bottom. I then partially poured off the fluid, and filtered the residue through paper, and on its being sufficiently dry to be removed, found it to weigh 1 ounce 6 drachms. It was then worked well in hot water two or three times, and formed into a mass which gave 6 drachms, thus losing 1 ounce. On the whole, it will be seen that the most economical method of preparing the juice, is by solar evaporization, the residue being nearly double to that of the second experiment.

"Result of the experiments in acids, alcohol, liquor-potassæ, and spirits of turpentine, on equal quantities of the muddar, made into small pellets, immersed forty-eight hours :

"Sulphuric acid.—Much charred, particularly outside. Cut a pellet in half, found the inside spotted, not charred, throughout; the remaining part stretching like tough dough.

"Nitric Acid.—Appeared converted into a yellow resinous substance, and gained about one-third in weight, which it lost again when dry; found it pliable under pressure of the finger. When mixed with water, it coloured it yellow.

"Muriatic acid.—Coloured somewhat like the sulphuric, but not so black; soft and plastic; no increase in weight; colour, brownish outside, with a reddish tinge inside.

"Acetic acid.—No diminution in weight whatever; apparently the same as when first immersed.

"Alcohol.—The substance apparently softened, and lost a trifle in weight; spirit slightly discoloured.

"Liquor potassæ.—Washed it in warm water, and let it dry; has a yellowish tinge; increased a little in weight, but become very ductile and adhesive.

"Spirits of Turpentine.—Placed one part in four of turpentine, and in twelve hours it was quite dissolved, forming a thick creamy substance, which, mixed with spirits of wine, would make a good varnish for silk or cloth.

"R. RIDDELL."

## HOME CORRESPONDENCE.

### PATENTS.

LETTER II.

SIR,—Last week I dealt with that primary argument in defence of patents which asserts or assumes that inventors have a natural or moral right to the intervention of the law to prevent anybody else from using the same invention for fourteen years. A still bolder form of the same argument, which the more indiscreet advocates of patents have sometimes put forward is, that the poor man who invents a thing out of which he may be able to make a fortune if he is granted a monopoly of it, has just as much *property* in it, and just the same claim to have that property secured to him by law, as a rich man has in the property which he has either received by bequest or made by his own exertions.

No doubt that mode of talking is extremely well calculated to obtain the assent and applause of the ignorant and uneducated, who are always too ready to listen to any preacher of the doctrine, that those who have got a larger share of the good things of this world than themselves have really no more right to it than they have. And accordingly I have no doubt, indeed, I know, that the law of patents is most popular with the lowest class of inventors, who can hardly be expected to take a very comprehensive or far-sighted view of the effects of any law, and also naturally enough fancy that they see in the patent system a chance of some day leaping into opulence by hitting upon an invention which will make their fortune; just as the very same class of men, with equal foresight and equal profit from experience, are always ready, under other circumstances, to combine for the purpose of resisting and exterminating any invention of which they fancy the effect will be to interfere with their own labour and immediate profits. In fact, patent laws are just as popular with this class as everything in the nature of a lottery has always been, and for very much the same reason; viz., that they offer them a chance, and a chance of about the same value as a lottery, of making a fortune by a lucky hit instead of by the toilsome and commonplace method of working for it; and this notwithstanding they know perfectly well, for they cannot look round them without seeing it, that for one man who raises himself from a low condition in life to a high one by a successful patent, hundreds do so by using their wits in minding their business, to say nothing of the other hundreds who have boasted what property they had by speculating in the patent lottery.

Plausible, therefore, and captivating as it may be to those whose education and experience does not qualify them to judge in many things what is even most for their own advantage in the long run, I should think that to any educated person the bare statement of such a proposition as the identity of property already realized with something by which property may be realized if the author of it is granted a monopoly, is equivalent to refuting it.

But I said also, it was a very indiscreet argument for the patent advocates to put forward; and I say so, because it at once invites this obvious answer—Very well; you demand that inventions shall be protected by the law as property is: so they shall be; all other property is protected by law in this way, and in this only, that the owner of it is allowed to do as he pleases with it; he may make it as profitable as he can or as unprofitable as he likes, but he is not allowed to interfere with anybody else doing what they like with theirs, and you may do the same with the invention which is your property. The opponents of the patent laws can desire nothing better than to see the defence of them rested on such grounds as these.

It is another common fallacy to represent the question of patents or no patents as one between the poor man, who invents without the capital to manufacture his inventions, and the rich man, who has the capital, and who would use the invention without paying for it, if there were no patents. This again, I suspect, is nothing but a device of the advocates of patents to get support on plausible and popular grounds, which they know have really nothing to do with the question. For, so far from patents making rich capitalists pay for what they would otherwise get for nothing, they evidently enable the manufacturer who buys the patent of the inventor to get larger profits by means of the monopoly than he could get without it. Undoubtedly he does pay for it in the first instance; but then the public, who buy the article when manufactured, have ultimately to repay the price so paid to the inventor, and as much more besides as the manufacturer finds he can sell the thing for with the help of his monopoly. Indeed, it is remarkable enough, that while the patent advocates are exclaiming, that if it were not for the protection of patents the rich manufacturers (whom, by the way, they generally assume to be incapable of inventing anything for themselves) would have an undue advantage from the inventions of other people, they are, on the other hand, always complaining that under the patent laws (or notwithstanding them, if they like it better), the capitalists do now get far the largest share of the profits, which, they say, ought to belong to the patentee. I dare say the ingenious reader has already on his lips the answer, that that is no reason why they should get the whole of the profits. But that answer will not do, for this very simple reason—that if there were no patents, there would be no profits arising from patents. There would be profits, of course, arising from the improved mode of manufacturing; but, inasmuch as every manufacturer could use the improvement if the monopoly were abolished, they would soon be reduced by competition to the ordinary level of the profits of the business, instead of being kept up for the benefit of the proprietor of the patent for the fourteen years of its duration, or until it is superseded by something better.

We may as well, therefore, dismiss the "rich capitalist" from the scene, seeing that his presence does not the least help to elucidate the inquiry; and that, so far as his intervention affects the case at all, it is exactly in the opposite direction to that which the advocates of the protection of inventions wish us to believe, patents being really much more of a "protection" to the capitalist who deals in them against the public, than a security to the inventor against the manufacturer; and the poorer the inventor, of course the less chance he has of making a good bargain for himself in selling his patent to the purchaser of it. But I am quite willing to deal with the question of the right of inventors to protection, as if every patent remained in the hands of the patentee himself, granting licenses under a royalty to everybody who chose to take them; and, consequently, as if there were no rich capitalists intervening between the inventor and the public to aggravate the effects of the monopoly: and this is evidently the most favourable way in which the case can be put for the "friends of the patentee." But although this is the favourable case for them, inasmuch as the tax upon the public for patented inventions would probably be much less under those circumstances, and we should have the satisfaction of knowing that it was levied for the benefit of the inventor, and not of the man who has bought him up, still it leaves the radical objections to the system untouched, and does nothing towards settling the fundamental question whether it is just, reasonable, or expedient, that one inventor of a thing should be allowed to stop everybody else from using it, who either has or might have invented it for himself, or who has discovered something else by which it has acquired a value far beyond what the patent-protected inventor was able to give it.

It is very easy to appeal to the names of Watt, Arkwright, Wheatstone, and a few other well-known names, and say, that if there had been no patents, these men, who have undoubtedly conferred great benefits on mankind, would probably have made nothing, or very much less by their inventions. But this argument is hardly less superficial and imperfect than the others. For unless you can prove on general grounds that all inventors are entitled, or ought to be allowed, to prevent everybody else from using the same invention, in order that they may have a chance of making their fortune, the fact that a few inventors have made their fortune by patents, clearly will not help the argument in favour of them. Every man who put into a lottery had a chance of making a large sum of money by it; lawyers had a chance of becoming Masters in Chancery; clergymen with 70*l*. a year, and seven children, were encouraged with the chance of what Sydney Smith called, "the great prizes in the Church." But lotteries were abolished because they are mischievous; Masters in Chancery are to be no more, because their work can all be done by the Judges under improved arrangements; "the great prizes" are so reduced in number and value, and small clergymen with large families so much increased in number, that the chance of each one of them ever getting a comfortable income, is enormously less than it was twenty years ago. And so inventors may depend upon it, that unless they can convince the public that patents ought to be kept up on general grounds of either justice or expediency, they will not be kept up in order that every one of the thousands of patentees in a year may have a chance, such as it is, of making his fortune, because Watt and Arkwright did.

Many persons seem to think that the question between patentees and the public is merely whether a newly invented article shall be sold for a little more, in order to give the inventor some reward for inventing it, or for a little less, in order that the public may have it without rewarding the inventor at all. But it is no such thing. If it were, there would, perhaps, be no more objection to patents than to copyrights. Probably books are dearer on account of copyright, but the public willingly acquiesce in that, because granting an author the exclusive right of publishing his own works, in many cases is the obvious, and the only possible mode by which he can be paid for his labour in writing them. And here we may notice another distinction between the monopoly of authors and the monopoly of inventors, besides those I pointed out before, viz., that copyright only enables an author to be paid for his actual work; and probably there is no labour worse remunerated, on the whole, in proportion to the talents required for it, than literary labour; whereas an inventor with a patent claims to be paid, not for his work, but for his ideas; and in order that he may be so paid, he demands that all future or contemporaneous inventors shall be stopped from using the same idea, although it may be equally their own, or from improving upon it (except by a deviation sufficiently wide to evade the patent), or from applying it to purposes of which the inventor himself had no idea when he got his patent, and was, perhaps, altogether incapable of contemplating or comprehending.

And it is yet further to be remarked, that, notwithstanding the existence of copyright, it does not reserve to the author the exclusive use of the ideas he may publish, but only of the words in which he has expressed them. Sir Isaac Newton, or Leibnitz, could not have had a patent for the differential calculus, nor Napier for the invention of logarithms; and yet, by discoveries and suggestions of this kind, and by multitudes of others which are every day given to the world in books, the powers of mankind are as much enlarged, and as much labour is saved, as by nearly any invention which has ever been protected by a patent: nay, if these very inventions of a literary kind which I have just mentioned had been for working calculations by wheels, and levers, and indexes, they could have been patented; but because they are for calculating only by pens, ink, and paper, they could not. Last week I showed that the defence of patents on the ground of their analogy to copyright fails, because copyright does not do what is the essence of patent right, viz., prevent other authors from writing everything they could have written if there had been no previous book on the subject, and does not obstruct the progress of literary science, but just the contrary; inasmuch as every book worth anything is an assistance and not an impediment to every subsequent writer on the same subject, and an addition to the literary property of the world. And now I have shown that on the further examination of this analogy between copyright and patents, it appears that the principles on which copyright is founded, and the effects of its operation, are not only no reason for, but are a strong reason against, the very different kind of protection which is conferred by a patent.

It is not unworthy of notice, too, that although the proportion of patentees who make any large sum of money to those who make none and lose a great deal is very small, that of authors who make a fortune by literature is far smaller; and not only that, but the only class of books by which a man has any chance of making a fortune, or even a good income for his life, are those which contribute least to the information but most to the amusement of mankind. And even such an income as the most successful author can make by writing books is only made (with exceptions as rare as Sir Walter Scott's are) by men who devote themselves entirely to that work; whereas the most profitable inventions are made by men who are all the time making their living by their business. In short, inventing is never the regular occupation of any man's time, except, perhaps, a few of that proverbially unsuccessful and unfortunate class of men, who are more properly to be called schemers than inventors, and who, as I said last week, have not the smallest claim to be compensated for the time they waste in making ignorant and unsuccessful attempts, and, according to the common phrase, beating about the bush instead of getting into it.

I have really been anxious to find out something else which would present even a *primâ facie* resemblance to the case of a patentee being allowed not only to tax, but to interfere with, the public, in order to enable him to receive a large sum of money for a single act, by which, if you like, the public is very much benefited, as distinguished from the usual occurrence of a man's being paid only for the work which he does from day to day; but no such instance occurs to me. There is obviously no analogy between making a large sum of money by the monopoly of an invention and making it by a single clever or lucky venture in trade or speculation; and even if there were, the trader or speculator at any rate does not do it by virtue of any protection or monopoly given him by a law made expressly for his benefit. Naval and military commanders are sometimes granted a fortune by Parliament for services rendered to the nation in a single great battle. But if anybody is inclined to compare the winning of an important battle with the giving to the world an important invention—and I do mean to say the comparison is an unfair one—still there is this striking difference between the rewards; that one is given voluntarily by the nation, and after the service has been fully performed, of which they can appreciate the value, and moreover, it is only a grant of a definite sum of money; whereas the reward given to the inventor is the *à priori* grant of a privilege, which may or may not enable him to make money, but which does certainly, whether the invention turns out of any real value to the public or not, enable him to interfere with other people who are not indebted to him at all, and to obstruct the progress of invention and science.

The proper parallel to the granting of rewards by Parliament to Generals who have performed great services for the nation, would be the granting of rewards by Parliament to inventors who have conferred great benefits on mankind; as, in fact, has been done in several cases which occur to me at once,—such as to Dr. Jenner, for the discovery of vaccination, and to some other medical discoverers; and also to several inventors of improvements in chronometers, under the Act for encouraging inventions for ascertaining longitude at sea. This is a very different thing from patents, and a thing to which I see no objection at all, provided, of course, proper precautions are taken to ascertain the value and originality of the invention to be rewarded. And the latter of these conditions, viz., the originality of the invention, is notoriously not secured by the patent laws at all. It may be perfectly clear to everybody, even to a Jury, that the idea and principle of the invention was suggested to the inventor by somebody else; and yet the patent may be perfectly good, inasmuch as it is a well known rule of law that a patent cannot be taken out for a principle. Thus, Kyan discovered the principle of preserving wood from dry rot, by saturating it with something that would destroy its vitality; and invented some stuff for the purpose. Then comes Sir W. Burnett, and obviously proceeding on the principle suggested by Kyan, finds out and patents some other stuff which produces the same effect at less cost; and to a great extent, I believe, superseded and supplanted Kyan, whom nobody can doubt to have been the really meritorious inventor. And cases of this kind occur, and must occur continually, under any system of protecting inventors by monopolies.

I think I have now sufficiently disposed of all the arguments which are usually put forward for the purpose of defending the monopoly of the patent laws, on any principle of right or justice to inventors. And therefore in my next letter I will consider the more moderate claims of those who think that it is on the whole *expedient* that inventors should be encouraged by the prospect of this kind of reward, even though they may be admitted to have no *right* to call on the public to concede it to them as a privilege. I will not, however, wait till next week to say that, although I believe this mode of rewarding inventors to be wrong, I entirely concur with those who think that scientific men ought to receive a great deal more direct encouragement and support from the nation than they do; and I have no doubt that the popular and very mistaken notion, that they may be sufficiently rewarded by getting patents for their inventions, is one of the reasons why purely scientific men are probably worse rewarded for what they do for the benefit of mankind than any other class of men whatever.

Yours faithfully,
E. B. DENISON.

Ben Rhydding, Leeds, 22nd August, 1853.

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SIR,—Mr. Denison may dislike any touching of his shield by an opponent without a cognizance, but inasmuch as he volunteered the throwing down his gauntlet to all and sundry, he cannot claim exemption on the score of his nobility, from the random blows of ruder antagonists in the *melée*. The truth will prevail, whether backed by the arguments of Mr. Denison or the anonymous "Cosmos." Their value depends not on the name, as Mr. Denison would have us believe.

However, I am thankful to have the benefit of Mr. Denison's arguments, even though unfortunately "he has no books to refer to" in confirmation, and am content to share the obloquy he heaps upon an anonymous correspondent.

Mr. Denison's assumption that inventors claim a "natural right" is simply an invention of his own or of lawmen before him, and not to be found in the inventor's brief, and which must not be palmed or foisted on them by the plausibility of adverse counsel. The term "natural right" is an absurdity. Nature is the law of God. Rights are rules, or things ruled by man, and sometimes ruled very crookedly when ruled by ignorant and selfish human power. Men claim rights in the streams, in the fisheries, in the land (as Mr. Denison will find it expressed in some of the old charters, with "white wax bitten with the tooth" by way of seal), "as high as heaven, as low as hell." Man has claimed right to the seas, and would have done to the air, could he have found out how to mark boundaries thereon, and take possession of the property. He did his best in the phrase "high as heaven," and left it on parchment records as evidence of his impotent will. Mr. Denison must know very well that no decently educated or clear-brained inventor, ever held the doctrine of "natural right," and states clearly enough the real origin, after failing to throw dust in the eyes of the jury by false imputations—

"He makes the giants first, and then he kills them."

"First let us consider this 'natural right' view of the case, of which we may remark by the way, that patents for inventions were not originally established on any such ground, but were a relict saved from that system of granting monopolies for the use of everything, which had become one of the national grievances two or three hundred years ago."

Precisely so; after the raw material of the land had been all embargoed and sold and the money spent, the descendants of those who took the land, *vi et armis*, seized the usufruct, and made all sorts of people pay them fines and quit rents for permission to turn it to account. In this mode the raw material was turned to account many times over, in proportion as working brains increased its value.

All these processes, not of "natural right," but of much particular wrong were upon the whole a great good to society, for without them, neither society nor arts, could have arisen. They are the rude processes of nature, by which the institution of "property" was worked out. And all property is a monopoly—it is something held by one person or set of persons independently of others. And it is the desire of this monopoly which induces people to work, and to accumulate, at least in the present condition of mankind. The monopoly of property was gained by strength, by might, by power, which perpetuated it in hereditary descent. And upon the whole, the strength and might and power were serviceable to mankind; whether the hereditary descent has been so, has often been disputed. The practice of granting patent monopolies for improvement useful to mankind is also hereditary, but it must be accompanied either by service or the appearance of service as often as the grant takes place; whereas the Insolvent Court constantly holds up to our view numerous examples of entailed estates, the owners of which never rendered any service whatever to mankind, but quite otherwise.

We have now got to the "admission"—a very difficult thing for a lawyer to come to—that a patent is a monopoly, as well as a private estate in land or other material things. But Mr. Denison will say, "a patent is a right conferred upon one individual by taking away a right, or rather an equitable claim, from many other individuals." And I answer, that an estate in land is a right conferred on one individual by granting the equitable claims of many other individuals, and merging them in the thing called Poor-law. Neither of these monopolies are justifiable upon any other principle, any more than the monopoly of the throne of England by a particular family, save that of an enlarged amount of benefit to the general community. And supposing them both to be unmitigated evils, the monopoly of the landed estate is infinitely the worst evil, because the law has done its best to make it perpetual in a family; whereas the patent monopoly expires in fourteen years, at furthest, from its date. The world, as it exists, is made up of monopolies; and so long as those monopolies represent human energies, they are beneficial things to society. When they cease to represent energy, and become the effete depositories of by-gone power, they are shams and mischiefs, and should be swept into Hades. The throne is a monopoly, from the presumed advantage of getting rid of all disputes of succession. The House of Lords is a monopoly by a senate of elders who revise the laws, and sometimes originate them, with provisions for a constant infusion of acute legal intellect. The House of Commons is a monopoly, for seven years, of the power of law-making. If not a class property, it is the property of the wealthy classes holding real property, and tending to preserve the useful institution of property. The judgment-seats are a monopoly of lawyers, and the magistrates' benches also, over which landed proprietors have reserved the monopoly to themselves; but an unjust judgment produces such an outcry, as to warn them that their monopoly is only held as a consequence of their presumed capacity and integrity.

Merchants of large capital are monopolists, and buy up all kinds of useful commodities to enhance their price and make a profit. Shallow people call them monopolists as a term of reproach. Yet without them there would be no large markets, and in time of dearth they are the instruments that by raising prices induce economy in consumers, and make the food or other commodities hold out.

Cotton lords are monopolists; but by their processes, they have made cotton cloth so plentiful, that they could clothe the whole globe with it as with a garment, were it desirable.

Railway contractors are monopolists, as witness their huge fortunes; but let no one grudge them who can appreciate how widely they have been benefactors to their fellows.

Foremen in factories are monopolists by dint of their business aptitudes; and, like other monopolists, they are sometimes tyrants.

But in all these cases, energy, more or less applied to the general benefit of the community, is the reason why such monopolies are sanctioned.

The other monopolies are of the raw material,—land, mines, forests, rivers, fisheries, harbours. These *may* be held without any other claim than *vis inertiæ* and hereditary law, without any service whatever to the community. Yet still they are sanctioned, from the perception, or supposition, that a man's energies would very much slacken, if he expected that the estate he had purchased by his labour would be taken by law from his children without compensation.

The same reason that prompts the community to make laws giving monopolies to the small body of people above enumerated for unlimited or limited terms, viz., value received, also prompts the community to give monopoly to inventors for a limited term, viz., value received. The highest kind of invention that will effect a great reduction of human drudgery, can scarcely be too highly paid, in giving the inventor the control of a large amount of the savings he has realised, by an original application of some principle of nature turned to the service of humanity. It is probable that no one will invent new mechanical powers separately considered, though new contributions may be widely used; but it is very probable that moral natural agencies may be used in the application of those powers. He who accomplishes the conquest of such an agency, and turns it to man's use, will derive a tribute from his fellows, and ought to reap his reward in cash and repute. So also he who first points out an ignorance, and a waste in national labour, and the mode of remedying it, is a a public benefactor.

But the discoveries of new natural agencies to supply the place of labour will be probably few. Heat in some one of its Protean forms may be better than in the others, but a monopoly of natural agencies is impossible. A new discovery will not rob mankind of the use of the old knowledge. And in new applications of old science, small indeed is the monopoly. When the public has a choice of twelve modes of old plans, it can well afford to wait till the new patent has run out, if it thinks the inventor hard in his terms.

The advantage the public gains by the patent is this—the inventor produces an improved mode of making cotton or flax or wool into cloth, stimulated to do so wholly by the profit and repute which may elevate him in the scale of society. He asks a large royalty, and gets a small profit, or a small royalty and gets a large profit; and in either case the result is to bring forth a crowd of new inventors, and perhaps patentees, to whom he has shown the way, and the public has the benefit of immediate competition. But for the individual working at the invention with a desire of monopoly in order to make himself a capitalist, the improvement would not be produced, any more than Acts of Parliament would be produced other than by an individual working at them for the sake of acquiring a name, and with a name reputation and power.

Mr. Denison says it is unjust, because another man might have invented it next day. By the same reasoning it is unjust to let a Member of Parliament make an Act badly, when perhaps Mr. Denison or some of his friends might make it much better; but the inferior man gets the preference because he has had industry, or energy, or power of some kind to force himself into the position.

Mr. Denison is particularly unfortunate in his reference to Mr. Watt, in the following paragraph as a proof, that patentees stop improvements:

> "He (Cosmos) then proceeded to expound himself, historically and philosophically, beginning somewhere about the time of Tubal Cain, and introducing an episode about James Watt and the steam engine, but forgetting that much more material and awkward fact for his argument, that if Watt had not also been lucky enough to hit upon the clumsy expedient of the sun-and-planet-wheel motion, for the purpose of evading a patent which had just before snapped up the monopoly of the crank, he would not have been able to make steam-engines of any use without first satisfying the exorbitant demands of the monopolist of the crank; and these demands, be it remembered, would be proportioned not to the value of the crank at the time it was invented, but to the new value that it acquired by Watt's own invention."

It so happens that Mr. Watt, in his specification, describes five different methods of communicating circular motion, including the crank and sun-and-planet wheels, thus proving that his inventive faculties were quite equal to the task of keeping him independent of the invention of the crank.

It certainly is not to the credit of an amateur rival of Louis XVI. in locks, the originality of whose invention has been questioned, to speak irreverently of the productions of a man of such philosophic and inventive powers as Mr. Watt. Of the movement in question—the sun-and-planet wheels, which Mr. Denison calls a clumsy expedient, a writer of high repute says:

> "One of these [movements] was a beautiful contrivance of one wheel revolving in an orbit round another, and they were called the sun-and-planet wheels, from the resemblance to the motion of those luminaries."

Thus the invention of the crank, pirated from Mr. Watt, did not subserve the purpose of the pirate, but actually caused the invention of four other methods, and doubtless would have brought forth others if needful.

I can rejoice with Mr. Denison in the cheapening of patents, but I cannot rejoice with the legal profession generally in the wide scope of litigation still left to strip the patentee of his earnings.

Mr. Denison rejoices in the prospect of patents, by reason of their cheapness, becoming "inconveniently numerous." The matter answers itself. If they be useless no one will covet them; if useful, they ought to be used, or equivalents invented for them. It must be a miserable nature that would refuse to use a beneficial thing in order to keep the inventor out of profit. It is scarcely credible, or if credible it is not creditable, that a man in high position should seek to destroy the reputation and advantages of skill in other men. To describe an engineer in chief as fearing the progress of inventions, the very instruments by which he should work, is certainly not flattering, and might well elicit the remark, "Save me from my friends."

Mr. Denison's quotation from the "Famous Judge," "hard cases make bad law;" may with more truth be reversed, "*bad law makes hard cases.*" There was a time when hard judges considered it a triumph to overthrow a patent; and their injustice reacted and has been the cause of saving some vicious patents, through sympathy with a beneficial class of men.

Here is another previous expression of opinion by Mr. Denison:

> "I said the majority of inventions are made without any great expenditure of time or money. It is notorious that not a few of the most important have been made by accident; some even by mistake. There is a physician from America now making his fortune in London by a discovery of a specific for a large and fatal class of diseases, which he made by a mistake, having accidentally applied one thing instead of another to a case of that disease. Nobody of course can grudge him the fortune he makes, because he is benefiting mankind as well as himself; and yet nobody can say that he has earned it by the expenditure of time, money, thought, or science, in arriving at the discovery."

Nobody can grudge him his reward, yet no one can say he has earned it. No, nor can any one say that the men *earned* the monster gold nugget, getting 8,000*l.* by two days' labour. No one can say that a man *earns* his money by buying and selling in the funds; and yet no one grudges the profit to the dealer in stock. If all the world could have used the American specific, it is probable the physician would not have been able to make a profit by devoting his time to it. If I understand rightly, he has some means of keeping the advantage to himself, and so the thing becomes patent and advertised to all the world. Individual interest is a general profit.

Why are boys at school put in classes, and made to take precedence of one another? Because their faculties are thereby sharpened, and they are rewarded for their quickness of response. So in the great world, the quick and intelligent men are put ahead of the others. People desire to get fortunes, and they sit and gamble and horserace. It is a property in human nature to speculate. It is the very basis of all commerce; and no speculation can be more beneficial than that of invention for the diminution of drudgery.

The last paragraph winds up with Mr. Denison's belief:

> "And therefore, although it may seem a startling proposition, I go at once to the bottom of the claim for protection of inventors, on the ground that they may have spent a great deal of time and money in arriving at their invention, by denying that that is a ground for the interference of the law on their behalf: in other words, I deny the natural or moral right of an inventor to stop the inventions, or the improvements, or the works of other people, in order that he may have the opportunity of making a large fortune by the result of a single piece of skill,—a single new application of science, perhaps a very slight step in advance of what has been done before; perhaps no advance at all; a single piece of lucky observation, accident, or mistake; or even the result of a long course of unprofitable and unsuccessful experiments, at last ending in the right one."

Substitute the word *land* for *inventions*, and the venue will all be changed. "I deny the natural or moral right of a land-owner to stop the possessor or cultivator in improvements of other people, in order that he may make a large fortune by rent, because his ancestors were lucky enough to come over with William the Conqueror, when he has done nothing beyond what the Saxon boors did before him; when he is only the result of a single lucky accident at his birth; and the multiplied profits of his estate have been brought about by a system of instruments, and draining, and cultivation, worked out by mechanical and chemical inventions."

To conclude: inventors understand that, in default of capital, their brains are the ladder by which they can ascend in social position; and the body who form jurors will take care that this wholesome state of affairs—the lower structure rolling up to the higher, as an essential condition of public safety—no "judgmatic law" shall break down.

The hackneyed phrase of monopoly should be well expounded. To excel is not to monopolise; to hold and possess without excelling is monopoly.

I am, Sir, yours,

Aug. 22nd, 1853. COSMOS.

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## LIST OF LECTURERS AND THEIR SUBJECTS.

——— Institution, Aug. 22, 1853.

SIR,—Your List of Lecturers is on many accounts a very important document, and will be very useful to the Institutions; but how much more important and more useful it would have been if the materials of which it is composed had been contributed by the whole number of Institutions in Union, instead of by only 66 out of 285! There are 148 names on the list of lecturers; and of these 95 are proposed by not more than one Institution. If, therefore, the whole 285 Institutions had filled up and returned your schedules, it is probable that we should have had twice or thrice the number of lecturers named, and that a very large proportion of them would have been gentlemen not generally known to the Institutions.

It is much to be lamented that the Society of Arts is not properly supported by the Institutes in Union. I felt ashamed when I saw that only 66 Institutes out of 285 had taken the trouble to reply to your circular of the 28th July. Your Society cannot help us if we will not stir a finger to help ourselves.

Yours obediently,

To the Editor. A WORKING MAN.

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SIR,—I was much pleased with the "List of Lecturers and their Subjects," which I received from the Society of Arts on Saturday. I am convinced that the collection and publication of such a list will materially aid the Committees of Institutions in their selection of Lecturers, and that the recommendations coming from the Institutions themselves will relieve the Council of the Society of Arts from any suspicion that might otherwise have arisen, of favouritism towards those Lecturers whose names were put forth by the Society.

My principal object, however, in troubling you, was to express my disappointment that only 66 out of 285 Institutions should have made returns to the Society's circular. This is to me a convincing proof that the Institutions in Union do not understand the great importance of a central office, as now supplied by the Society of Arts, for collecting facts and opinions from individual Institutions, and digesting, arranging, and re-issuing them in a convenient form for the use of Institutions in general. This listlessness will not last long; but every week is of importance, and I trust that these few lines, even, may rouse a few Committees from their apathy. In Institutional, as in all other matters, all knowledge, or the means of it, exists in some shape somewhere. It is organization alone that is wanted to make it available. In the early stages of civilization, knowledge passes direct from man to man; but when literature and science have attained to any importance, society is taught less by individuals than by the condensed knowledge of the many.

The Society of Institutions is certainly at present in the early stage of civilization, but that era may soon be passed if Committees and Secretaries will but study the importance of organization for general information, and avail themselves of such opportunities as the Union with the Society of Arts affords.

I perceive that several Lecturers advertise in your columns. Will you permit me to suggest that, for the

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convenience of Institutions, all such advertisements should be collected together, and headed by the word LECTURES.

A CHAIRMAN.

## SHIP BUILDING.

SIR,—I do not know whether the Society of Arts has or has not offered any premium for improvements in the art of Ship Building,—but if no such premium has been offered, I would respectfully suggest that some special Prizes should be offered, as well for a Treatise on the present most approved and novel systems of naval construction, as for any new modes of constructions; with especial reference in both cases to the sailing qualifications of clippers and yachts. When we find that English shipowners and merchants are giving orders for vessels to American ship-builders, I think it is high time for us to bestir ourselves, and to endeavour by all possible energy to maintain the hitherto high fame of Englishmen in this most necessary art. In my humble opinion, the Society of Arts, by offering adequate prizes for these subjects, may elicit many useful suggestions, and perhaps some novel systems of practical utility. At any rate, a Treatise on the art as practised here and in the United States, with illustrations of such vessels as the *Sovereign of the Seas*, etc., could not but be useful. And here permit me to say, that to my thinking, the Society of Arts would find it more conducive to the objects it has in view, to offer fewer but more *adequate* prizes. I think, that if the Society were to take a more limited range, confining the prizes, or the larger ones, to some important subject, that more beneficial results would accrue than from the present system of giving a mere medal for every imaginable want throughout the circle of art.

I am, Sir, your obedient Servant,

A MEMBER.

## IMPROVED OCEAN NAVIGATION.

A numerous meeting of merchants, ship-owners, captains, and others interested in navigation, was held on Thursday week, at Lloyd's, to receive from Lieut. Maury, of the United States' Navy, Superintendent of the National Observatory at Washington, explanations of the system adopted by the government of his own country for collecting and disseminating information relative to the direction and force of winds and ocean currents in all parts of the world, and meteorological observations.

Lieut. Maury said, that having taken a chart of the North Atlantic Ocean, he collected together all the men-of-war tracks that he could get hold of, and projected them on the chart in such a way as to show the method, direction, and force of the winds daily encountered by each vessel. Having done that, he was very much surprised to find that there was in the middle of the Atlantic what might be termed a blank space—a *terra incognita*;—a space in the ocean, lying between the outward bound vessels going to the southern hemisphere, and that of homeward bound vessels returning from it. On examining the matter further, he found it to be the impression of many navigators that, in order to get to the Equator from America, they must cross the Atlantic three times.

He recommended the middle, or new route; and the first vessel that had the courage to take it—the *W. H. C. Wright*, of Baltimore, Jackson, master—made the passage in twenty-four days, instead of forty-one days, which was the average by the old route. This fact enabled Lieut. Maury to enlist the voluntary co-operation of ship-masters, who furnished him with an abstract log of the daily position of the ship, of the prevailing direction of the wind, of the height of the barometer, of the state of the thermometer, and any remarks which might have occurred to them to make touching the winds and the waves, and the general course of navigation. He then began to co-ordinate the results, so that every one might be able to see in each month of the year what was the prevailing direction and character of the winds, and so be enabled to take advantage of regions in which the wind was favourable, and to avoid those in which they were unfavourable. Another system of investigation was then commenced, in which the ocean was divided into spaces of five degrees, and the results co-ordinated from the log-books were recorded thereon. These charts were furnished to American ship-masters (and it was desired to place British ship-masters on the same footing), on condition that they should enter into an engagement to keep and furnish to the government an abstract log, according to a certain form, containing the points of observation already referred to. It was peculiarly desirable that navigators should have some information as to the winds and currents in the Indian and Pacific Oceans; and he was thoroughly satisfied that the average passage hence to Australia might, by means of this system of investigation, be materially shortened, and reduced to something like certainty, even under canvas. Already the *Marco Polo* had made the passage in seventy days by adopting this system.

In dealing with the winds and currents, it occurred to Lieut. Maury to investigate some other matters connected with the industrial pursuits of the sea. He requested the American whaling-masters to furnish him with their journals. With these, and the map of the ocean divided into squares of five degrees each, he could tell how many days in each month of the year vessels spent in any particular part of the ocean looking for whales; how many days they had seen sperm whales, and how many they had seen right whales; by which means he had been able to see very clearly what parts of the ocean were most frequented by whales, and what parts of it, at various periods of the year, afforded the best hunting-grounds. It turned out that there was a belt of 2,500 miles in breadth, going right round the world, in which the right whale was never seen. The right whale could never cross the tropics; and, in the opinion of a whaler, who had been on both sides, the right whale of the North Pacific, and the right whale of Greenland was one and the same animal, the inferences being that at some period of the year there must be a water communication from one to the other through the Arctic Seas. This has led to the discovery by Lieut. De Haven, U.S.N., and Capt. Penny, of a north-west passage through an open sea.

## CALORIC SHIP, "ERICSSON."

WE are informed on good authority, says a correspondent of the *Journal of the Franklin Institute*, that the vessel has had removed from her the large cylinders of fourteen feet diameter, and six feet stroke, as well as the supply cylinders, eleven feet and a half diameter, and receivers, regenerators, &c.; in fact, all of that part of the machinery peculiar to Capt. Ericsson, and patented by him in the four quarters of the world. There still remains on board the shaft-wheels and cranks, which being of the ordinary kind may yet be of service. Having virtually abandoned every principle that he claimed, and which he advocated as late as the June Number of

*Appleton's Magazine*, the question arises, what will he do next? He has sustained himself as the perfector of a new motive power before the community for the last eighteen months, by the strictest secrecy as regards all practical results, and the exclusion from his ship of those capable of judging; and he now finds that those who have been termed by him, "smatterers," have (perhaps through their ignorance), been true prophets. It will be a pleasure to those foundries which were unable to make twenty feet cylinders, to be informed that Capt. Ericsson, in the new engines now going on board, has concluded to use them of about six feet diameter. It will, no doubt, be a source of regret to the late Secretary of the Navy, who advised Congress to build two ships like the *Ericsson*, to know that the two engines will not admit of those two large double pistons, which, by the reports of Capts. Sands and Ericsson, formed a peculiar feature of that ship, and ensured such regularity of motion. In the new engines now about being put in, the large cylinders have a diameter of about six feet, and the supply cylinders of a diameter of about three feet and a half. The same air is to be used at a high pressure over and over again, and is alternately heated and cooled as it passes through tubes immersed in fire (before it enters the large cylinders, and water after it leaves them). It is presumed that the new machinery will be on board in time to go to Washington before the next Congress adjourns, as it is thought that from the large number of experimental ships that have fallen into the hands of the Navy department in times past, government could not do better than make another investment, much to the relief of those unfortunate individuals who have furnished the capital for the present magnificent expedition.

## PROCEEDINGS OF INSTITUTIONS.

LOWESTOFT MECHANICS' INSTITUTION.—On Tuesday evening, the Tenth anniversary of the Institution was celebrated at the Town-hall by a conversazione, interspersed with vocal performances by professionals from Norwich. The hall was decorated with flags lent by Messrs. Fry, Morse, and Welton. On a table in the centre of the hall were various models of steam and other boats, specimens of medicinal products of various nations, and at the end a printing-press, and on the walls and front of the platform were hung various diagrams of Stonehenge, and other monumental stones to be found in the kingdom. In the absence of D. H. Fry, Esq., the business of the evening was opened with a suitable address by Dr. Brame. Mr. W. B. Wilton addressed the audience on steamboat machinery, Mr. W. F. Bard spoke upon the medicinal specimens, Mr. Oliver on the wonders achieved by the printing-press, while his employer struck off, to the amusement of many, specimens, which were distributed among the auditory. Mr. Bly made some interesting remarks upon Stonehenge and other Druidical remains, and promised two or three lectures on the same subject. Dr. Foreman gave an account of what had been done by the Institution, what were its present and what its future prospects, and expressed a hope that ere another year had seen its round, they would have the pleasure of meeting in their own Mechanics' Hall. D. H. Fry, Esq., who entered during the evening, warmly advocated the claims of the Institution, and drew a picture of what he wished and what he hoped to see it become. The evening was unpropitious, but the receipts were very good. It is hoped that the Institution has received an impetus which will not soon cease to be felt.

SEVENOAKS.—On Thursday, August 18th, Mr. W. Hughes, F.R.G.S., gave the third and concluding Lecture on "Physical Geography," to the members of the Literary Institution. On this occasion, Climate, and its Influence on the Vegetable and Animal Kingdoms, was principally dwelt on—the Ocean, and Volcanoes and Earthquakes, having been explained in the previous Lectures. At the conclusion, the Chairman, Mr. R. H. S. Smith, presented the thanks of the members to Mr. Hughes for his interesting and instructive series of Lectures.

## TO CORRESPONDENTS.

The peeling off from the stucco on houses is sometimes caused by the frost, from the work having been badly finished: sometimes from paint having been put upon the surface before the water used in the stucco had evaporated, or the walls on which the stucco was laid were dry: sometimes from salt water, or sand containing a considerable quantity of saline matter, being used with the stucco; and in the case of Roman or Parker's cement, from the circumstance that this stone or *septaria* (a ferruginous limestone) contains saline matter, which is not entirely driven off in the process of calcination, and which, after the cement is used, exudes on the surface. If the wall on which this stucco is placed is in a dry situation, this efflorescence is not of long continuation, but if in a damp situation it continues to exude for many years. In dry situations, after twelve months this cement may be painted upon with safety. There are many natural cements (limestones) which are free from saline substances; and most of the artificial hydraulic cements—for example, what is called Portland cement—are entirely free from the same. How to prevent the peeling off, or the exuding of saline matter from stuccoes containing the same, when the wall is damp, is very difficult to say. When the work is well done in London it is usually coloured the first year with a wash of lime, copperas, and ochre, and the second year painted, first with a priming of red lead and linseed oil, and afterwards with strong lead paint, tinted of a buff stone colour. There are many skilful plasterers who profess to have recipes for preventing this peeling off, but if the situation be damp, their success for above one or two years is doubtful when the stucco contains salt.

## MISCELLANEA.

FLAX.—A new Company has been formed in Paris for the manufacture of flax cotton upon the system of the Chevalier Claussen.

COFFEE.—In 1834 there was only one European coffee-planter in the interior of Ceylon; now there are about 300.

TEA.—The average yield of tea is about 120lbs. per acre, and the average cost of producing a pound is about 8*d*.

TEST FOR COPPER.—The *Technologiste* gives a method for detecting the presence of copper in spirits, and freeing them from it. Olive oil, it says, is not only well known as an excellent test for indicating the presence of a salt of copper in any liquid, but it is also a means of clearing spirits from any traces of copper which may have proceeded from the vessels in which they are distilled. If for this purpose a few drops of olive oil are introduced into the spirits, and shaken, in a few minutes, as soon as it begins to separate, it will be seen to take a green hue, and absorb all the copper which may happen to be present, so that the most delicate tests cannot fail to detect any trace of the metal.

SALT EXPORTED FROM THE UNITED KINGDOM.—A return which has recently been printed shows that the quantity of salt exported during the year 1851 was 18,233,405 bushels, and the declared value was 235,849*l*.

IMPORTATION OF HEMP.—From a return which has just been made to Parliament, it appears that in 1851 there were 1,301,488 cwt. of hemp imported, 1,194,184 cwt. of flax and tow, and 630,471 cwt. of flax seed and linseed.

New Patent Printing Machinery.—On Saturday afternoon a large number of gentlemen assembled at No. 5, Waterloo-place, to inspect some patent printing machinery, which it is proposed to carry into operation by means of a company of shareholders. The inventor is Major Beniowski. The primary feature of the scheme is the use of logotypes, the peculiarity of which is, that besides being composed of double, treble, and even quintuple combinations of letters, the character to be printed is stamped at the bottom of the type, and so presented first to the eye of the compositor; and, consequently, a person not trained in what is technically termed composing, can soon with great facility single out the letter or letters he requires. Logotypes, so far from being novel, were used in printing one newspaper, at least, towards the close of the last century. The reason assigned for their abolition was the immense space required for their proper arrangement, the frames employed being ten times as long as the ordinary existing case. To remedy this, Major Beniowski has devised what is termed "the authoritor," composed of 1,650 compartments rising above each other, and all placed within the reach of a person sitting opposite them in a chair. Here the single and combined letters are arranged in convenient alphabetical order; and, instead of being selected with the hand, are picked out with metal tweezers. Whatever difficulties may attend the practical every-day working of the machinery, there can be no doubt that the composing of the logotypes is an operation of great rapidity. It is part of the system that females and children can soon be taught to compose. On Saturday, a young lady composed five and a half lines from a newspaper, taken up at random, within three minutes, which is at the rate of 110 lines per hour—a speed far above that which is attainable under the established system, and which, if the other parts of the plan correspond with it, must have the effect of immensely reducing the cost of composition. The distribution of the type, after being used, is performed by means, first, of drawers into which it has to be dropped, and then by being slid down the composing apparatus in separate grooves. One important element of the scheme is the power which it will afford, if it can otherwise be made to work, of correcting the composed type in metal instead of proofs. In addition to the type apparatus, there is a new printing machine, the novel features of which are that the types are imposed on the interior surface of a cylinder, and therefore cannot, it is alleged, fall out by their own gravity, or be driven off by the centrifugal force; and that the feeding and receiving boards, the distributing, inking, and impression rollers, &c., are in the interior of a cylinder, and therefore the whole occupies one-third of the space that would otherwise be required. Great stress, also, is laid on the use of vulcanised India-rubber rollers, which are not affected by the temperature of the atmosphere.—*Daily News.*

A New Modelling Clay.—It is stated in *Cosmos* that M. Barreswill has prepared for the use of sculptors a new modelling clay, which does not dry but remains constantly moist. His process consists in moistening the clay not only with water, but with a concentrated solution of glycerine, a substance which does not dry.

## INVENTIONS.

Protecting Submarine Telegraph Wires.—Mr. T. Allan, of Adelphi-terrace, has taken out a patent for an improved plan of protecting submarine telegraphs, consisting of iron wires, twisted spirally round a central iron rod or core, leaving room between the spirals for the reception of the insulated telegraph wire. In a rope thus formed, the longitudinal strain and crushing effect will be borne entirely by the protecting wires, while those insulated will be fully protected from strain and injury. A considerable addition to the length necessary for the insulated wires appears to us inevitable from this twist; but we presume the specification includes the principle of laying them longitudinally round the iron core under the spiral covering wires, if found desirable.

Improved Preparation of Asphalte.—Mr. A. E. L. Bellford, of Holborn, has patented some improvements for rendering asphaltic and other bituminous substances applicable to various useful purposes. By this process they are first fused in metal cauldrons, and then passed through a sieve placed above a pair of rolls, between which the molten substance passes, which rolls are regulated according to the desired thickness of the sheets. The rolls are placed at suitable heights and distances from the winding-off or dividing rollers, around which is passed continuously either paper, canvas, or any kind of cloth or metallic fabric, which gives the rolled sheets great solidity, and a more uniform surface. These sheets may be made of any thickness required; or two or more sheets may be piled together, and again rolled, and are generally applicable to covering all kinds of buildings, the construction of pipes, coating walls, laying pavements, floorings, &c.

Chimney-pot.—Mr. C. W. White, of the Commercial-road, Pimlico, has filed a specification (dated 20th inst. for an improved chimney-pot and ventilator. The top is closed, and the smoke finds its exit at the interior spiral perforations, which perforations are covered by exterior spiral projections, or chambers, which prevent any action of currents of wind. The inventor claims for this peculiar construction the advantage of creating an upward current, or draught, rendering it very useful for ventilating purposes. The architectural effect produced by the spiral, the inventor considers, is of a pleasing character, and much superior to the many cowls and chimney-pots which disfigure the metropolis.

Sheathing Iron Ships.—Mr. W. Seaton has recently patented an improvement in sheathing or covering iron ships. He proposes to construct the lower portion of the vessel, from the water-line to the keel, with an even surface, by uniting the plates of iron by a chump or butt-joint, or edge to edge, secured inside by riveting a strip of metal over the seam, or joint. He then planks this surface with thin wood-planking, which is secured to the iron vessel by countersunk rivets, or screws. Between the iron and the planking, felt may be interposed to render the whole more secure and watertight. This even surface of wood is to be sheathed with copper, Muntz's metal, or other alloy of metal, in the same manner as an ordinary wooden vessel would be sheathed. The speedy oxidation and consequent corrosion of the sides and bottoms of iron vessels would thus, the inventor says, be prevented; the ship so covered would in all respects be stronger, and the extra expense, taking into account the advantages gained, would be inconsiderable. Since wooden vessels are almost without exception sheathed with copper, and iron vessels require some covering to protect them from barnacles, oxidation, &c. the inventor claims to have discovered a great desideratum in naval economy.

Improved Whim.—Mr. J. Maynard, a miner of Illogan, in order to prevent the accidents which not unfrequently occur, both to men and horses, through the running of whims, proposes to fix a drag to the shaft of the whim, to be acted upon by a lever conveyed through a pipe or launder, under ground, to the landing brace or place, with a handle, by which, if the load runs away with the horse, or any other accident occurs, the lander may immediately stop the whim. As the driver is usually afraid to run out of the whim-round, and generally throws himself on the ground, it is suggested that another lever should be placed near the shaft of the whim, for the driver to assist the exertions of the lander.

Improved Refrigerator.—A model and drawing of this refrigerator by Mr. J. Williams, of Hayle, was shown to the judges at the Exhibition of the Royal Cornwall Polytechnic Society, as applied to rapidly reduce the temperature of the wort in the process of brewing. The pipes for conveying the cold water were small and of thin tinned copper, and were fixed to a wooden frame, hinged to one side of the cooler, or "back," in order that they may be raised for the convenience of cleaning the latter, or for repairs. To ensure the exposure of every part of the cooling surface to the wort, the latter is made to flow in a contrary and zigzag direction along the cooler, by means of cross divisions, which are alternately close at one end, and open at the other. These are also attached to the frames which carry the pipes so as to be lifted out together. An additional horizontal branch pipe is attached to the refrigerator for the purpose of emptying it before it is lifted from the cooler. By this arrangement the cold water which has been heated by the first of the wort is successively brought in contact with hotter and hotter portions of it.

**Improved Lock for Sliding Panels and Doors.**—Mr. J. Lidstone, of Devonport, has invented a lock to be used on board ship, where sliding panels and doors are in constant requisition. The projecting part of the bolt is in the form of the letter **T**, the head of the **T** being vertical, and entering a vertical and narrow opening in a plate let into the edge of the panel. The bolt itself is cylindrical, and can be turned on its axis, so that the **T** head can assume the horizontal position, when it forms a sort of button, and allows the panels and doors to be slidden along without separating them. The key is only turned once round. The first part of the turn raises a tumbler and delivers the bolt; on further turning it, it raises another tumbler, and draws forward a flat bolt at right angles to the first, and wholly concealed in the lock. This flat bolt carries three teeth, which fit into corresponding cavities in the cylindrical bolt, and as it moves forward turns the cylindrical bolt one-fourth round, when the tumbler again falls, and retains it in this position. The entire arrangement of the lock is very simple and effective, with extremely little liability to get out of order.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

*Delivered on 16th, 17th, 18th, and 19th August*, 1853.

Par. No.
898. Peterborough Election Petitions—Report from Committee.
645. Calicoes, &c—Return.
849. Omagh Nunnery School—Return.
895. Salt, &c —Account.
934. Peterborough Election—Report from Committee.
881. Navy, Army, Commissariat, and Ordnance Services—Detailed Accounts.
870. Post-Office—Return.
885. Highways—Returns.
903. Copper, &c.—Account.
906. Railways—Return.
925. Malt—Account.
960. Army Prize-money—Account.
965. Assurance Associations—Report from Committee.
953. Liverpool Election—Minutes of Evidence.
922. Bill—Government of India (Lords' Amendments.)
815. ,, —Public Libraries and Museums.
Russia—Correspondence.
China—Order in Council.
China—Papers relating to the Civil War.
Turnpike Trusts—Reports of the Secretary of State.
Court of Rome—Further Papers.
Public General Acts—Cap. 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, and 63.

*Delivered on 20th August.*

889. Registration of Assurances Bill—Report from Committee.
918. Quarantine (Carthagena)—Copy of a Dispatch.
931. General Board of Health—Account.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 19th August*, 1853.

*Dated 26th May*, 1853.

1290. E. White, Ipswich—Supplying water to towns.

*Dated 31st May.*

1337. H. Hughes and W. T. Denham, Cottage-place, City-road—Pianofortes.

*Dated 13th July.*

1667. A. Morton, Cockerill-buildings, Bartholomew-close—Manufacture of paints, &c.

*Dated 15th July.*

1697. W. E. Newton, 66, Chancery-lane—Apparatus for digging, &c. (A communication.)

*Dated 18th July.*

1710. S. Perkes, 1, Walbrook—Portable metallic folding bed steads, &c.

*Dated 21st July.*

1723. J. Lilley, Thingwall, Woodchurch, Cheshire—Separating matter in stalks and leaves of plantain, &c., for making ropes, &c.

*Dated 25th July.*

1750. Professor C. F. Spieker, New York—Generating and fixing ammonia.

*Dated 2nd August.*

1801. J. Griffiths, Stepaside Saunderfoot, Tenby—Steam-engines.
1803. W. L. Anderson, Norwood—Propeller.
1805. A. J. Quinche, 16, Castle-street, Holborn—Measuring distances travelled by vehicles.
1808. M. E. Boura, Crayford, Kent—Supplying ships with water, air, or ballast.
1809. G. Richardson, Gutter-lane, Cheapside—Stoves for warming.

*Dated 3rd August.*

1810. T. Atkins, Oxford—Transmitting power to agricultural instruments.
1811. J. C. Daniell, Bath—Preparing food and litter for cattle.
1812. J. Slack, Manchester—Reeds for looms.
1813. W. E. Newton, 66, Chancery-lane—Machinery for cutting cardboard, &c. (A communication.)
1815. W. S. Roden and W. Thomas, Ebbw-vale Iron-works, Monmouthshire—Rolling metals.
1816. J. Macintosh, Pall-mall—Bridges, viaducts, &c.
1817. A. M. Servan, 8, Philpot-lane, London—Soap.
1818. J. Billings, 8, Luton-place, George-street, Greenwich—Roofing buildings.
1819. J. Cumming, Glasgow—Printing shawls, &c.

*Dated 4th August.*

1820. W. Hickson, Carlisle—Canal and river navigation in vessels, and propelling.
1821. C. H. Snell, Triangle, Hackney—Soap.
1822. G. Armitage, Bradford—Presses.
1823. C. B. Clough, Tyddyn, Flintshire—Machinery for washing, &c., woven fabrics, &c., felts, &c., corn roots, &c.
1824. R. B. Roden, Abersychan Iron-works, Newport, Monmouthshire—Rolling iron, &c.
1825. T. Moss, 24, Gainford-street, Islington—Printing bank-notes, &c.
1826. B. L. F. X. Pléchelle, Paris—Carrying, bedding, and bathing sick persons.
1827. G. F. Wilson, Belmont, Vauxhall, and A. J. Austen, Trinity-place, Wandsworth-road—Apparatus for making mould candles.

*Dated 5th August.*

1829. W. Smith and T. Phillips, Snow-hill—Boiler.
1830. R. Peters, Southwark—Apparatus for ascertaining distance traversed by cabs, &c.
1832. E. T. Bellhouse, Eagle Foundry, Manchester—Fireproof structures.
1833. W. and J. Garforth, Dukinfield, Chester—Machinery for making bricks.
1834. R. Hunt, 18, Cottage-place, Greenwich—Tile, and making same.
1835. J. Lee Norton, 8, Holland-street, Blackfriars-road—Obtaining wool from fabrics to be used again.
1836. W. Newton, 66, Chancery-lane—Coating cast-iron with other metals, &c. (A communication.)

*Dated 6th August.*

1837. M. Z. Just, Manchester—Hulling rice. (A communication.)
1838. J. Hughes, 34, Great George-street, Westminster—Building structures under water or under ground.
1839. J. Martin, High-street, Marylebone—Shade for gas and other burners.
1840. A. E. L. Bellford, 16, Castle-street, Holborn—Combination of glass and iron for floors, roofs, windows, pavements, &c. (A communication.)

1841. R. B. Martin, Suffolk-street, Haymarket—Plate-warmer.
1843. R. Morrison, Newcastle-upon-Tyne—Apparatus for forging, shaping, and crushing iron, &c., and driving piles.
1844. P. A. le Comte de Fontainemoreau, 4, South-street, Finsbury—Transmitting power. (A communication.)
1845. J. Green, 10, Queenhithe—Printing machinery. (A communication.)

*Dated 8th August.*

1846. R. Christy and J. Knowles, Fairfield, Manchester—Terry cloth, and machinery for same.
1847. W. E. Newton, 66, Chancery-lane—Horse-shoes. (A communication.)
1848. W. Hickson, Carlisle—Heat for baking and drying, and in generating steam.
1849. M. Poole, Avenue-road, Regent's-park—Regulating flow and pressure of gas and other fluids. (A communication.)

*Dated 9th August.*

1850. T. Y. Hall, Newcastle-upon-Tyne—Combining glass with other materials.
1852. W. Rowan, Belfast—Looms and apparatus connected therewith.
1854. L. H. Bruck, Mark-lane—Construction of tunnels, sewers, drains, &c., for hydraulic or other purposes.

*Dated 10th August.*

1856. H. Peters, Birmingham—Pens and penholders.
1858. J. Burden, Stirling—Cock or tap.
1860. J. P. A. Galibert, M.D., Paris, and 4, Trafalgar-square—Domestic telegraph.

*Dated 11th August.*

1866. J. Rushbury, Wolverhampton—Lock.
1868. T. Dewsnup, Manchester—Motive-power.
1872. H. M Naylor, 111, Montpelier-row, Bloomsbury, Birmingham—Affixing postage and other stamps.
1874. G. Deards, Harlow—Lamps.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 19th August, 1853.*

430. James Chadnor White, of Liverpool-street—Improvements in fastenings for harness, and which are also applicable to other like purposes.
441. James Mash, of Highfield-terrace, Kentish-town, and Joseph Sharp Bailey, of Keighley—Improvements in weaving machinery employed in the manufacture of textile fabrics, and in the manufacture of such fabrics.
445. Thomas Bell, of Bristol, and Richard Chrimes, of Rotherham—Improvements in valves, applicable to the receiving and discharging of water or other fluids.
463. John Green, of York-buildings, New-road—Invention which he designates "Green's Economical Self-basting Cooking Apparatus."
622. Peter Armand le Comte de Fontainemoreau, of 4, South-street, Finsbury—Improved apparatus for filtering liquids. (A communication.)
646. Joseph Maudslay, of Lambeth—Improvements in screw-propellers for ships and other vessels.
719. Charles Augustus Holm, of Cecil-street, Strand—Improvements in propelling vessels.
834. John Grist, of the New North-road—Improvements in machinery for the manufacture of casks, barrels, and other similar vessels.
915. Jean Baptiste Maniquet, of Paris—Improvements in machinery or apparatus for winding, cleaning, doubling, twisting, and spinning silk, cotton, wool, flax, hemp, and other filamentous materials.
1054. John Balmforth, William Balmforth, and Thomas Balmforth, all of Clayton, Lancashire—Improvements in steam hammers.
1058. John Filmore Kingston, of Carrol, Maryland—Improvements in reaping and mowing machinery.
1261. George Marriott, of Hull—Improvements in the manufacture of fire-lighters.
1321. Edward Duclos de Boussois, of Paris—Improvements in preventing incrustation of steam-boilers.
1364. James Mayelston, of Elloughton, Yorkshire—Improvements in the manufacture and refining of sugar.
1367. Thomas Barnabas Daft, of Lezange-lodge, Isle of Man—Improvements in inkstands.
1424. Christopher Nickels, of Albany-road, Surrey, and James Hobson, of Leicester—Improvements in the manufacture of carpets and other piled fabrics.
1441. Thomas Richardson, of Newcastle-on-Tyne—Improvements in the manufacture of certain salts of magnesia and a red colouring matter.
1442. Joseph Leon Talabot, of Chaussée d'Antin, Paris, and John Davie Morries Stirling, of the Larches, near Birmingham—Improvements in the manufacture of iron.
1453. James Dilkes and Edward Turner, of Leicester—Improvements in door-springs.
1469. Clinton Roosevelt, of New York—Invention for reducing the friction of the journals of railway and other carriages, which is also applicable to the journals of machinery.
1471. Benjamin Finch, of Dublin—Improvements in apparatus for supplying water to steam-boilers.
1483. Henry Bessemer, of St. Pancras-road—Improvements in the manufacture of waterproof or partially waterproof fabrics.
1490. James Shanks, of St. Helen's, Lancashire—Improvements in the manufacture of alkali from common salt.
1537. George Sands Sidney, of Brixton-road—Improvements in jugs or vessels for containing liquids.
1566. Peter Armand le Comte de Fontainemoreau, of 4, South-street, Finsbury—Improvements in the construction of furnaces. (A communication.)
1568. Robert Moore Sievier, of Louviers, France—Improvements in the manufacture of piled fabrics, and in machinery for effecting the same.

*Sealed 20th August.*

442. William Pidding, of the Strand—Improvements in coverings for the feet of bipeds or quadrupeds.
443. Richard Farrant, of Pimlico—An improved chimney-pot.
444. Ezra Miles, of Soulbury—Improvements in railway breaks.
452. George Winiwarter, of Red Lion-square—Improvements in the manufacture of fire-arms.

*Sealed 23rd August.*

478. John Palmer De la Pons, of Carlton-hill, St. John's-wood—Improvements in applying skids or drags to omnibuses.
480. Henry Martyn Nicholls, of Gower-place—Improvements in emission or reaction engines.
482. John George Taylor, of King-street, Cheapside—Improvements in ornamental fastenings for dress.
516. Laurence Hill, junior, of Port Glasgow—Improvements in the production of motive power. (A communication.)
579. Thomas James Perry, of the Lozells, Birmingham—A new or improved method of constructing cornice-poles and picture and curtain-rods, and other rods from which articles are suspended.
656. Edward Nickels, of the Albany-road, Camberwell—Improvements in preparing lubricating matters. (A communication.)
657. John Livesey, of New Lenton—Improvements in pile and looped fabrics, in cutting and finishing such fabrics, and in the machinery employed therein.
737. Thomas James Perry, of the Lozells, Birmingham—Improvements in printing.
1240. John Hippisley, of Stoneaston—Improvements in steam-engines suitable for agricultural purposes, and to locomotives on common roads.
1360. William Edward Newton, of 66, Chancery-lane—Improvements in the manufacture of soles for boots, shoes, and other coverings for the feet. (A communication.)
1422. Richard Archibald Brooman, of Fleet-street—Improvements in the manufacture of paper. (A communication.)
1601. George Mackay, of Buckingham-street, Strand—Improvements in the manufacture of glass. (A communication.)

*Sealed 24th August.*

465. Henry Walmsley, of Failsworth, near Manchester, and Thomas Critchley, of the same place—Improvements in machinery or apparatus for retarding or stopping railway trains, which machinery or apparatus is also applicable as a signal or communication from one part of a train to the other.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| August 18 | 3499 | Victoria Copper Pouch, Advertiser, and Sample-bag. | Samuel Bremner | Carlisle. |
| „ 19 | 3500 | A Combined Refrigerator and Filter for Icing Filtered Water. | Thomas D. Mills | 1, Vernon-street, Vernon-square, Pentonville. |
| „ 23 | 3501 | The Convenient Cobbler; or, Travellers' Companion. | Charles Palmer | 1, Church row, Islington |

# SOCIETY OF ARTS.

### FRIDAY, SEPTEMBER 2nd, 1853.

## PRODUCTION OF STARCH.

During the time that wheat was at a high price, in 1796, this Society, with the view of saving as much grain as possible for food, offered a premium of the Gold Medal, or Thirty Guineas, for the discovery of a method of manufacturing starch from materials not used as food for man; and, in 1796, it was awarded to Mrs. Jane Gibbs, of Portland, who prepared as much as two hundred-weight of starch from the root of the common *Arum Maculatum*. It appears, from Mrs. Gibbs' communication, that a peck of the roots yielded about four pounds of starch, and was thus prepared:—The roots being cleansed and pounded in a stone mortar with water, the whole was then strained, and after settling, the water being poured off, the starch remained at the bottom. A sample was deposited in the Society's Museum.[*] The manufacture of this article, notwithstanding the high price of its cost, continued to be carried on in the Island of Portland for many years, and was sold under the name of the "Portland Arrowroot."

Mr. Groves, in a paper communicated to the *Pharmaceutical Journal*, states that the manufacture is now almost extinct, on account of the change which has taken place in the cultivation of the land there, no fallow every other year, as formerly, being allowed, the usual rotation of crops being now introduced. The growth of the wild arum is therefore to a great extent put an end to, and with it the manufacture of arrowroot. Besides this, the common has been enclosed for Government purposes. It appears that the manufacture is now confined to one old woman, and no quantity can be obtained, though she gets 1*s*. 4*d*. a pound for it. The Portlanders value it much. Compared with Bermuda arrowroot it does not make so clear or firm a jelly, but it is perfectly inodorous, tasteless, and destitute of colour. The granules under a microscope appear of an irregular spherical shape, varying much in size, but on the average are smaller than ordinary starches, except rice-starch. It is singular that this arrowroot should only be manufactured on the Island of Portland; though on some of the commons near Weymouth the plant is abundant. The country people there however do not appear to know that it is of any use. This arrowroot is stated to have been prepared on the island from time immemorial; and it is a singular fact, that the plant is called by the islanders arrowroot, from its arrow-shaped leaves. Mr. Groves suggests whether the *Maranta arundinacea* may not have derived its English name from the previously-known arrowroot of the Island of Portland, and not from what is usually stated—that the name is taken from the use to which the early American Indians were accustomed to apply the juice extracted from another species of *maranta*, the *Maranta galanga*, employed as an antidote to poison, in which hostile tribes dipped their arrows.

At the present time, when corn is dear, and the potato has been so uncertain a crop for many years past, the discovery of a new source whence an abundant supply of starch may be cheaply obtained is highly important, not merely as an article of food, but as forming a large item in many manufacturing processes—such as the glazing of fabrics, manufacture of dextrine, brandy, &c. With this view, it appears that *La Societé d'Encouragement* in France has offered a prize "for the cultivation in France of farinaceous roots for food, not hitherto cultivated in Europe, suited by the quantity and quality of their products to be substituted for the potato." M. Basset, a French physician, has claimed the prize. He states that, after a laborious research for three years, he has at last found a plant in which the fecula, or starch, is equal, both in quantity and quality, to that of the potato. The plant is the *Fritillaria imperialis*, the well-known crown imperial of our gardens. The bulbs of this plant sometimes reach the weight of three quarters of a pound, or thereabouts, and have a strong smell. Each scale of the bulb is almost entirely composed of fecula—so much so, that it may with truth be said, that with the exception of a thin skin covering them, and a few bunches of vascular tissue, they are one entire mass of pure starch. The grains of the starch are oval, and of a perfect white colour. M. C. Robin, a skilful microscopist, states the diameter of the grains to be of three sizes.

Some experiments show that the production of pure starch amounts to thirty or thirty-five per cent. of the bulbs used, while potatoes yield not more than twenty-eight per cent. of starch.

Careful comparative analyses of the potato, and the crown imperial, give the following results:

| Potato. | | Crown Imperial. | |
|---|---|---|---|
| Water . . . | 70 | Water . . . | 68 |
| Starch . . . | 20 | Starch . . . | 23 |
| Soluble matters | 4 | Soluble matters | 5 |
| Dry residue . . | 6 | Dry residue . . | 4 |
| | 100 | | 100 |

From the experiments thus made, we may fairly reckon on a produce varying from twenty-three to thirty per cent. of the fresh bulbs employed, showing a result in favour of the crown imperial of three per cent. at least.

The starch, if intended to be used in the arts, needs only two or three washings in water; but if for the purposes of food, then more care must be taken in its preparation to get rid of the peculiar flavour and smell. This is accomplished by washing it for forty-eight hours in clean water, in addition to the previous washings, changing the water two or three times during the above period. The starch may be rendered also more pure by adding to the water in which it is washed one-fiftieth part of common vinegar, or one-thousandth part of soda.

The method of obtaining the starch is as follows:—The bulbs, after being well washed, are rasped in the same manner as potatoes, but with less trouble, and the pulp placed on a sieve, on which a stream of water is kept continually flowing; the starch falls to the bottom, and the water being poured off, is left to dry. It is then washed and soaked as-above described, according to the purposes for which it is intended.

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[*] Soc. Trans., vol. XV., p. 237.

The next point is, the cost and facility of cultivation. The Crown Imperial, though a native of the East, and said originally to have been brought from Constantinople to France, in 1570, is now so much acclimatized as to be considered indigenous. It grows freely in all parts of France, and stands the severest cold of winter and the greatest heat of summer. The bulbs keep well in cellars or store-rooms till the spring; and in this respect they are equal to the potato.

It is propagated by offsets, which are developed outside the old bulbs or by sowing the seed. The offsets are planted about six inches apart, in rows, one foot from each other, in a light loamy soil, without manure, but well dug twice. In the spring it is again dug between the rows to destroy the weeds, and in July the bulbs are taken up for the extraction of the starch, and the offsets are taken off and preserved till September for raising the next crop. At the end of the first year the bulb will weigh, on the average, three or four ounces, but will weigh half a pound if left in the ground another year, and the yield of starch is proportionably greater. This second or biennial method of cultivation is preferable to the first, notwithstanding it requires a second digging in the autumn, and a third digging in the following spring.

By the annual method of cultivation, an acre planted with 88,000 offsets produces, after supplying offsets for the next crop, an average of 15,840 lbs. of bulbs, which, at the moderate calculation of 23 per cent., yield 3,600 lbs. of starch. By the biennial method of cultivation, the acre produces 44,400 lbs. of bulbs, or 10,000 lbs. of starch; giving an annual produce of 5,000 lbs., instead of 3,600. The cost of cultivation by the annual method, and of the manufacture of the starch, appears to amount to 2*s.* 10*d.* for 100 lbs.; whilst by the biennial method of cultivation the cost is reduced to nearly one-half.

Even allowing that there may be some error in the figures, it is quite clear that the cost of producing starch from the crown imperial will not exceed 4*s.* for the 100 lbs., whilst the starch from potatoes is sold at 12*s.* the 100 lbs. There is, however, another advantage in cultivating this bulb; it will not bear a freshly-manured land, but takes its place in crop best after another crop for which the land has been manured, and it leaves the ground ready for a cereal crop with only half the usual quantity of manure.—This is M. Basset's plan.

## CHINA-STONE AND CHINA-CLAYS OF CORNWALL.

The subject of China-stone and China-clays of Cornwall is so important, and so little known, that it is thought desirable to print the following essay, communicated to the Royal Polytechnic Society, and published in its Journal.

### *An Essay on the China-stone and China-clays of Cornwall, with a description of some Mechanical Improvements in the mode of preparation of the latter.*

BY MR. H. M. STOKER, OF ST. AUSTELL, CORNWALL.

The china-stone and china-clays, of our county, or the disintegrated granites, have, of late years, assumed a no less important than interesting feature in its history; not only to the capitalist, from the great addition the discovery of their use has made to its commercial importance; to the working-classes, from the necessarily co-existent increase of employment; to the shipping, from the quantity annually exported; but also to the traveller, from the picturesque scenes, the preparation of these articles have added to the previously existing and unexampled ones offered him for contemplation in the various modes of raising and rendering available the mineral wealth for which we have been so long and so justly famed. And not only to these, but to the practical chemist as well, does it afford matter for speculation, inasmuch as the supply of the former of these articles is so limited, as to require, in the course of a very few years, some cheap and easily-available substitute; whether to be supplied from this or from some other county, is a question to be determined only by the conjoined efforts of the miner, the geologist, and the analytical chemist.

From these few remarks, any apology for the appearance of the present essay would only be out of place, especially when we take into consideration the paucity of information possessed even by such men as the jurors of the Exhibition of 1851, as proved by their indifference both to the purity and quantity of the raw material; and this is now the more to be deplored from the contrast presented to us in the degree of attention paid by those jurors who investigated the merits of this article in its manufactured state, and by the observations necessarily made on other raw material; not less than from the fact that in no work with which I am at present acquainted has the preparation of the source of this article been fully described.

These observations will be found to refer generally to those districts whence the greater amount is attainable; and from them I have reason to hope that some few general laws may be deduced, whereby, when the present source is exhausted, other localities may be found in the county for their supply.

Attention was first directed to the fact, that the disintegrated granite and clays of our county, as well as those of Devon, when fused or burnt, could be rendered available to the potter, in 1768, by the late Mr. Cookworthy, of Plymouth, who extensively exported them to the potteries of Staffordshire for that purpose, from Devon; subsequently to which large beds of a like description of clays were found in the parish of St. Stephens; and it having been ascertained that the decomposing granite from which such beds are formed was capable, when fused, of forming a suitable glaze for the articles made of the clay, a large trade was at once opened, which has continued progressively to increase till the present time.

The disintegrated granite, under the name of china-stone, from the use to which it was applied, was exported at a later period than the china-clay, or kaolin. This article of commerce not having been introduced till the year 1802, when it was first raised from a bed of great purity, containing no iron or manganese, but merely felspar, silica, and mica, in varying proportions; and this is at present the only source from which it can be obtained of a sufficient degree of purity for ordinary purposes; though from its price, and the efforts that have been made by chemists, both here and in the potteries, to gain a substitute for it, it is very doubtful whether it will long continue so; more especially if the distance we are placed from Stafford be taken into consideration.

Most of the granites from which the china-stone was formed differ from ordinary granite only in the existence in the latter of plates of talc, hornblende, or diallage, the presence of either of which render the china-stone in which they are found, though but in small proportions, of not even the slightest use, from the black or brown-coloured slag of silicate of iron or manganese, found on fusion. Some variation, too, may be found in the amount of each of the ingredients which I have named; but this affects neither the clay formed on a continuation of the disintegrating process, nor is it supposed to exert any influenee on the glazing properties of the stone.

The places in which a search for this article would be instituted with the greatest probability of success is in the proximity of fissured granite rocks, containing, or supposed to have contained, softened stone; or in hills with rounded heavy summits, the beds of which are placed horizontally, and felspar (or feldspar) forming its predominating ingredient.

The bed from which it is obtained is about three-fourths of a mile in extent on the contiguous borders of the parishes of St. Dennis and St. Stephen's, occupying almost the centre of the central granite district of the county, and is surrounded by other primary rocks, of igneous origin, which, as they stretch towards the coast on either side, merge into beds of killas, or clay-slate; on the eastern and northern boundaries the granite is more irregular and abrupt in character than on the other sides, is more porphyritic, and contains a much larger proportion of felspar, in large white or red opaque, cubic, or rhomboidal crystals; while on the south it is separated from the neighbouring granite by a large elvan dyke; and it is worthy of notice, that while on one side of this, you may find China-stone perfectly pure, on the other, only from one to two feet distant, the stone is rendered useless by the presence of small plates of talc, embedded in dense gray granite, which also forms a portion of the eastern boundary.

Any one who has carefully studied the porphyry dykes, or the general nature of the primary rocks of our country, cannot but have noticed the difference in the temperature at which some of them have been upheaved compared to that of others; for while some of our granites are composed of substances which have in their crystals a certain amount of water that has not been lost, others have no trace of it, their felspar having become an amorphous-looking powder (kaolin); and others presenting the same waxy edge on fracture that is noticed in porcelain, particularly the elvan dykes: and from this it has been conjectured, though to me it appears doubtful, that as the melting point of other minerals was considerably below that of these rocks, at the time of the extraordinary convulsion to which our county has been subjected, the China-stone was by this means freed from iron, &c.; and that on its having reached the surface, the water by which it was surrounded at once caused the crystals of felspar to split, lose their outline and character, and become easily acted on by the solvent power of rain-water, which, by depriving it of a portion of its potash, leaves the crystals of quartz, or silicic acid, and plates of mica, glistening with a silvery hue, imbedded in a mass of silicate of potash and alumina; which, from the loss of crystallization, cannot be termed felspar, nor is it kaolin, for it has not been subjected sufficiently long to the causes which lead to its formation.

Many have thought, and do still suppose, that the clay is gradually forming into granite, and confidently assert that the whole of the middle granite tract was undoubtedly formed from clay beds; the geologist, I need scarcely add, will be able to estimate this at its proper worth: others also add, that this mass has been thrown up in the water which at first covered it, and fell back on itself, which they assert accounts for the flattened outline the tops of the hills of this district present.

The chief causes which I believe to have led to its disintegration, and not only to the formation of China-stone, or China-clay, but to that of all the land at present in cultivation, or capable of being cultivated, are; first, external physical agents, proved by the fact that China-stone is very seldom found at a depth of more than from twenty to thirty feet from the surface; the influence of the seasons; the changes from hot to cold on a body composed of crystals possessing such different expansive powers as those of felspar and quartz; and the solvent power of rain-water: while, as chemical agents, we have; secondly, the influence of the excess of carbonic acid in the air, as well as that from the interior of the earth, of the influence of which we have abundant proof in the excellent crops obtainable near lavas, or wherever this gas can gain access to the compound silicates of which the greatest portion of the earth's crust consists; and by the influence of respiration in rooms provided with windows, which may have been exposed for a long period to its application.

At present, while there is a great demand for the article, the spot from whence China-stone is procured presents the appearance of a large rabbit-burrow, as there are no less than nine sets for the district, the proprietor of each of which has his portion of the hill covered with the mouths of pits, around which are stationed a number of men with their wagons, who, after the China-stone has been raised by quarrying and the employment of powder, carry it to one of the nearest ports to be shipped for the potteries of Staffordshire and Worcestershire. These ports are distant seven or nine miles from the quarries, entailing in this transport a considerable amount of land-carriage, and a consequent increase in the price, which of late years has been raised from 12*s*. to 20*s*. free on board, at Par, Pentewan, or Charlestown; still the demand has by no means diminished, and the proprietors of these setts have been obliged to fix a certain limit to their annual supply of 18,000 tons, which rate of consumption will have effected the removal of all the China-stone in these beds in rather less than fifty years.

The number of people employed in its preparation are comparatively few, as the operation of blasting requires but two or three persons in each pit; and in loading the wagons the parties employed as carriers are but too eager to fill in order to gain a load. The before-mentioned reasons render the question of supply an important one, and one well worthy the attention of the landowner as to future resources, and the influence the discovery of any large bed of good stone would exert on his pocket; though, while the present setts of the China-stone Company of Cornwall hold out, they not only can but will maintain a monopoly.

China-stone, in its present state, consists of a mixture of quartz, felspar, and mica, blended so as to form an homogenous mass, which very much resembles granite, though its texture is not so compact; the quartz exists in small bluish-white and transparent crystals, the edges of which, by the process of disintegration, are rendered more or less indistinct, and they have become more transparent than when in the form of granite. These crystals are imbedded in a mixture of white felspar, which has lost a portion of its potash, and small opaque scales of mica having a lustrous silvery aspect, and very thin: the granite from which it has been formed is of the simplest kind, the commoner forms containing, in addition to the mica, quartz and felspar, which may be either red or gray, crystals and scales of hornblende, diallage, or talc, with a more or less appreciable amount of iron, indicated by the black spots formed on fusion or calcination; and as the chemical composition of this article, when pure, should indicate an absence of these deteriorating qualities, until some cheap mode of separating these constituents from the otherwise vitrifiable granites of our county be found, the China-stone at present in use must retain its pre-eminence, consisting as it does of a pure double silicate of potash and alumina, which, when fused, forms a pearl-white translucent mass, firm and resonant, consisting of an opaque body of nearly perfectly formed kaolin, surrounded by and diffused through the glaze of silicic acid, to which its transparency is due: and not only does the foregoing deteriorating substances render the article useless, but should there be a very great excess of quartz crystals or silica the article will not, from the formation of single silicates, be capable of fusion at any temperature; though this fault may be remedied by the addition of either potash or soda, to which the vitrification not only of this, but of the various kinds of glass, is also due; felspar, according to Liebeg, containing 17·75 per cent. of potash.

China-stone is used in the potteries for a number of purposes, the most important of which are; first, in the formation of clay bodies to form biscuit ware; secondly, to strengthen clays rendered poor by the absence of potash; and thirdly, in the preparation or construction of glazes for the calcined biscuit ware, when mixed with other ingredients.

The manufactured China-stone and China-clay is termed "pottery," of which there are several varieties, each containing different proportions of China-stone, clay, and other articles. In the porcelain series there is said to be but three per cent of potash; but this I imagine, from the transparency and purity of the body, to be inaccurate. The Chinese used to employ the ashes of ferns, which, from the amount of carbonate of potash they contain, gave to it that richness and blending of the body with the glaze for which it has been long remarkable; bone-ash was also used, both by the Chinese and French, and is now employed by our potters in considerable quantity, for the sake of the phosphate of lime it contains, which, during the process of fusion, adds considerably to the transparency of the ware without rendering the glaze liable to craze or peel off, as would be the case were lime alone employed; in fact, at times, during a single firing, more than 5,000*l.* worth of pottery is rendered useless by the admixture of this earth, the surface of the services becoming covered with a congeries of cracks and fissures; hence great care is necessary to prevent its addition.

The terms employed to designate the kinds of calcined and fused wares, are: pipe-clay, the least used and least important; queen's ware; terra cotta; basalts; and porcelain biscuit; the whole of which were introduced by Wedgewood, to whose persevering, accurate, and scientific research, we are indebted for the position our pottery now holds; and it should not be forgotten that the rapid strides by which we have gained it, and the discoveries that have of later years been made in this art, have been wholly derived from a good practical acquaintance with chemical analysis, the importance of which cannot be too strongly urged on both the potter and the producer of the raw material. The other and more common wares are, porcelain; pottery, an inferior kind of porcelain; and earthenware; to the description of which I shall for the present confine my attention, that of the before-mentioned wares, as well as of parian, biscuit china, &c., belonging more strictly to the province of the potter than to that of the writer of the present Essay; though, from the history of the experiments to which their existence is due, the subject will be found fraught with interest to the chemist and geologist.

Until a very late period pottery manufacture was comparatively unknown in England; in the eighteenth century we were indebted entirely to the Chinese for our best, and to the continental potteries for our commoner wares. A century has but elapsed, and to the credit of the industrious, the persevering, the indefatigably speculating Englishman, be it added, that from pole to pole, under any portion of the globe's equator, wherever the traveller may roam in search of adventure, no less than through the length and breadth of his happy little island home, he will find, in his cup, his plate, or his dish, a never-dying testimonial to the enterprising character of the Englishman.

In porcelain or China, and the coarser variety termed pottery, the ingredients are so combined as to act chemically on each other, the decomposed felspar, consisting of a fusible glass of silicate of alumina and potash, more opaque than that formed by the fused silex in which it is disseminated; and when the body is formed of China-clay, infusible at the highest temperature, in the process of vitrifaction, it is so acted on as to form a substance uniformly opaque, having a vitreous, waxy fracture; and when coloured by some metallic base, is termed stone ware.

There are two kinds of China or porcelain; the one termed the hard China was formerly imported from France, though, of late years, it has been altogether superseded by the second variety, or soft China. The body of hard China may be conveniently formed by a mixture of ingredients in the following proportions.

| | |
|---|---|
| Kaolin, or China-clay | 70 parts |
| Felspar . . . . . | 14 ,, |
| Sand . . . . . . | 12 ,, |
| Selenite . . . . . | 4 ,, |

which, calcined, forms the biscuit; this, after being dipped in a mixture of potash and felspar, is again heated, when vitrifaction ensues, the article possessing a homogenous translucent structure, and not a mere glaze or coat, as found on the common earthenware. In making soft China the English potters fully vitrify the ware by the first application of heat, the shape of the article being kept by ground flint, removable with ease after it is taken from the oven, and the glaze being subsequently applied is vitrified at a lower temperature than that used in the formation of the biscuit of soft China, the ingredients used to form which are,—

| | |
|---|---|
| Bone . . . | 46 parts. |
| Kaolin . . . | 31 ,, |
| China-stone . | 23 ,, |

In making the glaze, a frit is first formed, which renders the glaze more easily applicable to the surface of the biscuit, by calcining a mixture similar to the following

| | |
|---|---|
| China-stone . | 25 parts. |
| Soda . . . | 6 ,, |
| Borax . . . | 3 ,, |
| Nitre . . . | 1 ,, |

Of this frit, when ground, 26 parts are taken, and added to, or mixed with—

26 of ground China-stone,
31 of White Lead,
7 of Flint,
7 of Carbonate of Lime, &c.,
3 of Oxide of Tin,

in which the biscuit is dipped prior to the last application of heat. The colours to be laid on the ware are applied and burnt in prior to the formation of the glaze, an article often requiring a separate burning for each different colour; thus, especially in gilded articles, entailing an additional amount of cost and labour.

The China-stone increases the strength and sonorosity of the article, while the ground flint gives whiteness and density to the base of plastic clay: earths are by themselves infusible, but on the addition of silex or silica, another name for quartz, we form a silicate, to which, if we add a third of earth, with an alcaline base, we form a body vitrifiable and uniformly translucent.

As it may not be uninteresting to my readers, I shall briefly attempt to describe the mode in which the China-stone and China-clay are treated, prior to their being turned, twisted, and flattened, to form the numberless articles in which they greet the eye.

The China-stone is ground to a fine powder by means of a number of stones which are kept rotating on the bottom of a paved vat, when it, as well as the clay and ground flint, are mixed with a certain quantity of water, by a process termed "bluging," till of the consistence of cream, when it is passed in a state of slop or slip through a series of cambric or lawn sieves kept rapidly revolving by a water-wheel, each pint of the clay slip weighing twenty-four ounces, while that of the flint or China-stone weighs thirty-two ounces; it is then passed through a very fine silk sieve, after which these ingredients are mixed together in variable proportions in a large vat or tub, and, as soon as the mixture has attained its requisite consistence, the water is driven off by evaporation, which causing the slip to contain in its interstices an innumerable quantity of air globules, renders it necessary that it should be submitted to the process of kneading or beating, after which it was formerly thought necessary, though now abandoned, that this mass should lie fallow for three or four months, when it is considered to be fit for the lathe.

The proportions of the ingredients used in the different kinds of earthenware are as follow:

In cream colour or painted ware—Dorsetshire clay, 56 parts; kaolin or China-clay, 27; flint, 14; and China-stone, 3 parts.
In brown ware—red clay, 83; Dorset clay, 13; flint, 2; and manganese, 2 parts.
In drab ware—Cane marl, 32; Dorset clay, 22; China-stone, 45; and nickel, 1 part.
In jasper—barytes, 32; kaolin, 15; Dorset clay, 15; stone, 33; and of lead, 3 parts.

The glazes commonly used for the cream-coloured ware consists of varying proportions of white lead and China-stone, or, as these may craze, a frit of the following materials is often employed:

Of China-stone, 30; flint, 16; red lead, 25; soda, 12; and borax, 17 parts: 26 parts of this are then mixed with 15 of China-stone, 10 of flint glass, 9 of flint, and 40 of white lead; which constitutes the fritted glaze.

The composition of most of the bodies and clays now used is a secret confined to the walls of the mixing-room, so that it is extremely difficult to ascertain with any degree of accuracy, the influence of an excess of ingredients; thereby entailing a co-existent difficulty on the part of the producer, in his endeavour to form or prepare a substitute for these articles.

(*To be continued.*)

## LECTURES.

An Association has just been formed, called the Hants and South Wilts Lecturers' Association, the object of which is the promotion of lectures on scientific and literary subjects in Institutes, Schools, &c. The operations are intended to include all Institutions situated in Hants and South Wilts, upon their placing themselves in union with the Association. The members are divided into two classes,—annual subscribers of 1*l.* for expenses, and lecturers whose gratuitous services shall be accepted by the Committee of the Association. The management is vested in an executive Committee of at least five members, chosen annually; the president and secretaries of the Alton, Andover, Basingstoke, Lymington, Portsmouth, Salisbury, Southampton, and Winchester Institutions in connection with the Society of Arts, on putting themselves in union, and the secretaries of local districts, having the privilege of attending and voting at all meetings of the Committee.

The range of the Society's operation will be, from time to time, divided by the Committee into local districts, as convenience may require, comprising from eight to twelve Institutions requiring lectures; the members in each district appointing a secretary to act for the whole. The subscriptions are intended to be devoted in aid of the general objects of the Association, and to the purchase of diagrams, charts, books, or papers for the use of lecturers, and the Association will endeavour to provide lectures as much as possible on the principle of mutual and gratuitous assistance. Each Institution nominated by a gratuitous lecturer or resident subscribing member will receive one lecture free of all payment for every lecture given and subscription paid. Institutions in Union will otherwise pay 1*l.* in towns, and 10*s.* in villages, each lecture, towards the expenses of paid lecturers, or 10*s.* and 5*s.* respectively, if gratuitous. All payments will be made direct to the Association, and in no case whatever to the lecturer.

The formation of this Association is mainly due to the Hon. and Rev. Samuel Best, who has undertaken the duties of its honorary secretary.

## AMERICAN PATENT LAW.

The following case is given, as showing an important and novel decision affecting the validity of Patents in America. There has not been any decision in the English Courts which goes so far as this:

A suit was brought by the plaintiffs, as assignees of Daniel Fitzgerald, to recover damages for the infringement of Letters Patent, granted to Fitzgerald, June 1st, 1843, for an improvement in iron safes. The case was tried before Judge Nelson, in New York, in the year 1848; and, for the first time in that country, the doctrine was announced, that if a new machine, or art, had been previously known, and had afterwards been entirely lost sight of and forgotten, and the memory of the old machine, or art, had passed away, such a prior knowledge would not invalidate a subsequent patent obtained by one who had discovered anew the same art, or machine. This view was adopted by the judge in his charge to the jury on the trial, who thereupon found a verdict in favour of the patent, which was afterwards, on appeal, confirmed by the Supreme Court of the United States; three judges, M'Lean, Daniels, and Grier, dissenting from the opinion delivered from the Court.

The peculiar state of the facts on which that question came before the Jury in New York, and before the Supreme Court, was this:

It appeared that James Conner, who carried on the business of a stereotype-founder in the city of New York, made a safe for his own use between the years 1829 and 1832, in which plaster of Paris was employed as a non-conductor, for the protection of his papers against fire; and that he continued to use this safe until 1838, when it passed into other hands. It was kept in his counting-room, and known to the persons engaged in the foundry, and after it passed out of his hands, he used others of a different construction. It did not appear from the evidence what became of this safe afterwards; and there was nothing in the testimony from which it could be inferred that its mode of construction was known to the person into whose possession it fell, or that any value was attached to it as a place of security for papers against fire, or that it was ever used for that purpose. Upon these facts, the Court instructed the jury, that "if Conner had not made his discovery public, and it had been finally forgotten or abandoned, such a discovery and use would be no obstacle to the taking out of a patent by Fitzgerald, or those claiming under him, if he was an original, though not the first, inventor or discoverer."

In delivering the opinion of the Court, Chief Justice Taney compared Fitzgerald's discovery to the discovery of one of the lost Arts. "It is well known," he said, "that centuries ago discoveries were made in certain arts, the fruits of which are come down to us, but the means by which the work was accomplished are at this day unknown. The knowledge has been lost for ages. Yet it would hardly be doubted, if any one now discovered an art thus lost, and it was a useful improvement, that upon a fair construction of the Act of Congress, he would be entitled to a Patent. Yet he would not literally be the first, or original inventor, but he would be the first to confer on the public the benefit of the invention. He would discover what is unknown, and communicate knowledge which the public had not the means of obtaining without his invention. Upon the same principle, and upon the same rule of construction, we think that Fitzgerald must be regarded as the first and original inventor of the safe in question. The case as to this point admits that although Conner's safe had been kept and used for years, yet no test had been applied to it, and its capacity for resisting heat was not known. There was no evidence to show that any particular value was attached to it after it had passed from his possession, or that it was ever afterwards used as a place for security for papers; and it appeared that he himself did not attempt to make another like the one he is supposed to have invented, but used a different one. And upon this state of the evidence, the Court put it to the Jury to say whether this safe had been finally forgotten or abandoned before Fitzgerald's invention, and whether he was the original inventor of the safe for which he obtained the patent; directing them, if they found these two facts, that their verdict must be for the plaintiff. We think there is no error in this instruction; for if the Conner safe had passed away from the memory of Conner himself, and of those who had seen it, and the safe itself had disappeared, the knowledge of the improvement was as completely lost as if it had never been discovered, the public could derive no benefit from it until it was discovered by another inventor; and if Fitzgerald made his discovery by his own efforts, without any knowledge of Conner's, he invented an improvement that was then new, and at that time unknown; and it was not the less new and unknown because Conner's safe was recalled to his memory by the success of Fitzgerald's."

This was the principal question presented in the case as tried at New York, and as argued before the Supreme Court. (*See* 10 *Howard*, 477).

The same case was tried with a like result in Boston, and subsequently came to be tried before the Circuit Court of the United States for the Western District in Pennsylvania.

In the latter case, much light was thrown upon that question by the production on both sides of very full testimony, in reference to the nature and extent of Connor's prior use. The relative merits of Fitzgerald and Conner, as inventors, were more fully investigated in this case than had been hitherto before done; and the precise extent to which the manufacture of Conner had been carried, was brought before the Court and Jury; and although these new facts, involving other points, were such as to warrant the Jury in coming to a verdict contrary to the two former ones, yet in instructing the Jury as to the principle of law involved in this question, Mr. Justice Grier adopted and cited the decision of the Supreme Court above referred to, and left the application of that principle to the particular facts developed as at this trial to the Jury. He said, in charging the Jury,—

"The next question to be considered (if you find the defendants have infringed the patent) is, whether the patentee is the original and first inventor. As I have said, the patent is *primâ facie* evidence of this; that is, sufficient till the contrary is shown. The Patent Act of 1836, section 6, provides, 'that any person or persons having discovered or invented any new or useful art or machine, manufacture, or composition of matter, or any new or useful improvement on any art, machine, manufacture, or composition of matter, not known or used before his or their discovery, or invention thereof, may apply for a patent,' &c. The applicant is required to make oath or affirmation that he does verily believe that he is the original and first inventor, &c.; and that he does not know or believe that the same was ever before known or used. The Commissioner is required, before he is allowed to grant a patent, to inquire whether the same had been discovered or invented by any other person in this country prior to the alleged invention or discovery thereof by the applicant.

"The mere speculation of a philosopher or mechanic, never put into actual practice or operation, will not deprive a subsequent inventor who has employed his labour and talents in putting into practice, of the reward due to his ingenuity and enterprise. But if the first inventor reduced his theory to practice, and put his machine, or other invention, into use, the law would never intend that the greater or less use, in which it might be, or the more or less widely the knowledge of its existence might circulate, should constitute the criterion by which to decide upon the validity of any subsequent patent for the invention. A patent may therefore be defeated, by showing that the thing secured by the patent had been discovered and put into actual use prior to the discovery of the patentee, however limited the use or knowledge of the prior discovery might have been. (*Bedford* v. *Hunt*, 1 Mason, 302).

"If the original inventor of a machine abandons the use of it, and does not take out a patent first, no other person can entitle himself to a patent for it (*Evans* v.

*Eaton*, 1 Peters, 323). There are exceptions to this general rule as in case of a lost art, where the knowledge of it has been lost for ages; and in the present case, if you should find that Conner discovered this valuable property of plaster of paris before Fitzgerald had put it in practice by lining the interstices of a safe, but that the safe itself had disappeared, and the knowledge of the improvement was completely lost as if it had never been discovered, and Fitzgerald had afterwards made the same invention and discovery anew, his patent might stand. But if Conner's safe was in existence and in use, and the knowledge of it not entirely forgotten and lost, his omission to bring it into public use or notice by public exhibitions or experiments would not give Fitzgerald, if he was a posterior inventor, a right to a patent. Conner might have abandoned its use, and been ignorant of the extent of its value, yet his invention was substantially the same with that of Fitzgerald, the latter would not upon that ground be entitled to a patent, provided Conner's safe and its mode of construction were still on the memory of Conner, or in the knowledge or use of others before they were recalled by Fitzgerald's patent (10 Howard, 498).

"The evidence bearing on this point has been very fully and ably commented on by counsel. It is for you to apply it to the principles of law announced by the court."

## HOME CORRESPONDENCE.

### PATENTS.*

### LETTER III.

A common argument in defence of patents is, that they are necessary for the purpose of encouraging inventors, who, it is supposed, would not invent without the chance of being so rewarded. I believe this supposition to be altogether a mistake; and I do so, although, I dare say, a great majority of the present patentees would tell you they are fully persuaded they should never have made their inventions unless they could have patented them. But even if I were to admit, which I do not, that they are capable of judging correctly what they would have done in a state of things so different as the non-existence of a Patent Law, it would affect the question very little; inasmuch, as the great majority of patents were notoriously got for inventions not worth a farthing, even when they cost six times as much as they do now; and, of course, a still larger proportion of the more numerous inventions that are now patented are equally worthless. The only question we have to consider is, whether the abolition of patents would diminish the number of really useful inventions; and I believe it would not, for the following reasons.

There can be no doubt that far the greatest number of useful inventions are made by persons who see what is wanted, or what would be an improvement, in the particular business or art which they follow or cultivate, whether as masters, workmen, or amateurs; for this is little more than saying, that a man who understands a particular "mystery" is more likely to invent improvements in it than one who does not understand it: which, however, though it is so evident a truth as to be almost a truism, seems to be very often forgotten by that class of inventors whom I have before ventured to call schemers. How, then, is a master or manufacturer of any kind likely to be no longer anxious to make improvements which will enable him to produce either a better article at the old price, or the same article at a cheaper price, merely because he can no longer have a monopoly of the improvement? If it is necessary to answer such a question, there are two obvious reasons why manufacturers will not cease to have an interest in making improvements: first, because all improvements in the quality or cheapness of anything causes an increased consumption of it, and therefore increased profits to the manufacturers of it; and secondly, because, whether there are patents or not, the man who first makes an improvement gets a start over his competitors, which is certain to be valuable to him, both from the fact that for some time he is the only person of whom the improved or the cheaper article can be obtained, and because there is generally a disposition in the public to resort to the inventor, under the belief that he is more likely to execute his own invention well than other people. This, I remember, was adverted to by several of the witnesses before the Committee on the Patent Laws in 1851.

And the same reasons which will always make it the interest of manufacturers to introduce improvements of their own, will equally make it their interest to adopt such improvements as may be suggested to them by their workmen, or by strangers, or by amateur mechanics or chemists. It is easy to say that they will probably listen to the suggestions of such persons, perhaps profess to think nothing of them, and then quickly adopt them and leave the inventor unrewarded; and the patent advocates are ready enough with instances of such things being continually done now. I certainly do not mean to assert that the abolition of the patent laws will abolish dishonest manufacturers or engineers; but those who are so loudly complaining of the existence of frauds of this kind now, must remember that they are thereby proclaiming, and rightly proclaiming, that the patent laws are *not* in that respect a protection to inventors. But, strange as it may seem, I do believe that the abolition of patents would be more likely to diminish frauds of this kind than to increase them. For one effect of the patent laws is to make everybody regard the patentee of a thing they want to use as their enemy, and as a person to be supplanted by any possible means; and it cannot be denied that there is some truth in what has often been said, that the law itself rather encourages this view, by the difficulties with which it has surrounded the defence of a patent after it has been granted. At present, if I go to a manufacturer with an invention which he privately thinks likely to be valuable to him, and ask him to take a patent for it in my name, and buy it of me, it immediately occurs to him (supposing him to be the "smart" man we are talking of) that it will be a much better thing to laugh at it, and tell me it is old, or that it won't do, or that he has just made the same invention himself, and has already entered a *caveat* at the Patent-office, or any other of the thousand-and-one lies or evasions which "smart" men keep in stock for their various occasions—for it is just a question whether the invention shall be his or mine; and having got rid of me he can very easily make it his, especially if I am too poor to go to law with him: and, by the way, the believers in the cheap patent millennium may as well remember that the expense of getting the patent is only a very small part of the performance, if it comes to a litigated question of validity or invasion.

But if it is no longer to be the question between the manufacturer and me, which of us is to have the patent, or exclusive use of the thing, but merely whether he shall give me some reasonable sum for the suggestion, the whole affair assumes a different aspect, and the temptation to him to perpetrate the aforesaid piece of smartness becomes—I do not say annihilated, but much diminished. It may occur to him that the man who has made one suggestion to him of a valuable improvement may not be unlikely to make others, and that it is not worth while to lose the chance of any future assistance for the sake of what are to him only a few pounds, though to the inventor they may be a good many. He will know, too, that his mode of dealing with one inventor, especially if it be among his own workmen, will soon become known to others; and that one such fraud may consequently have the effect of sending all those who would naturally have offered their inventions to him, to somebody else more honest. So that, even on the lowest ground, I believe that the abolition of the system of encouraging inventors by a monopoly which sets everybody against them, would probably render them not more but less liable to have their inventions stolen without acknowledgment or reward than they are at present. And at any rate these cases of stealing inventions would be the exception, and not the rule. The ordinary and regular practice with all manufacturers of good character, no one can doubt, would be to reward fairly any workman who suggested a real improvement to them: and the men would of course be in the long run influenced by what they found to be the rule, and not by an occasional and discreditable exception to it. And at the same time they would not have the temptation, which a large manufacturer told me only a few days ago prevails at present, to neglect their work while they are dreaming and scheming after some contrivance by which they expect to make not a moderate sum which would be a convenient addition to their regular wages, though not enough to induce them to lose their wages for the sake of it, but a fortune which is to set them above wages and work for ever.

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* Errata in last letter:—P. 486, second column, fourth line from bottom, for *boasted* read *lost*; p. 488, second column, twenty-fifth line from top, read, "I do *not* mean."

It cannot be necessary to say three words for the purpose of proving that the cessation of patents would have no tendency to cause a cessation of inventions either by amateurs, who take up any particular art or science at their leisure and for their pleasure, or by purely scientific men, who make science their business or their principal occupation. Whether they make or publish their inventions or discoveries from mere ambition and vanity, as is supposed by mean and vulgar-minded men who can understand nobody doing anything except from selfish motives, or whether they are influenced by the desire to increase the knowledge or the welfare of mankind, is of no consequence, since neither of these motives can be affected by the existence or non-existence of patents: and everybody knows that the prospect of making their fortune by patents is not the motive which influences men who make science either their occupation or their amusement. It is not the least answer to this to point out instances of patents, and very valuable ones too, every now and then obtained by this class of persons; for so long as the law of patents exists, there can be no reason whatever why any man of science, especially while the direct rewards and encouragement given to them by the nation are so small, should disdain to avail himself of it when he has an opportunity; and this, even though he may entertain the strongest opinion that the law ought not to exist. No doubt, if he finds afterwards that the patent is becoming an obstruction to the progress of the art to which it belongs, any man of science would be inclined, if he could afford it, to forego the advantage of retaining it, and would give it up to the public, as Mr. Talbot lately did with his patent for the photographic progress which bears his name.

There is only one other class of inventors on whom the probable effect of the abolition of patents has to be considered; and that is the class I have so often referred to in terms more of commiseration than admiration. I admit that it is possible that their numbers might be diminished if the patent lottery were shut up. But I do not admit that this would be any misfortune either to the world or to themselves, inasmuch as both their inventions and themselves are at present proverbially unsuccessful and unfortunate; and the few useful inventions which they do occasionally make they would be at least as likely to make if they had only the same kind of encouragement to make them as I have just been explaining that ordinary workmen would have. We should no longer have men neglecting their proper business, by which they might make a comfortable living, and, if they are clever and prudent, probably raise themselves to a higher condition, and wasting their time and any little money they can get hold of on schemes not much better than perpetual motion, not a few of them on that singular delusion itself, of which a very small amount of real science would have enabled them to demonstrate the impossibility, as completely as that any two sides of a triangle are greater than the third. Many a man will commit this kind of folly, like the folly of any other gambling, for the chance, however small, of making a large sum of money, who would never think of doing it for the tolerable certainty of making a moderate sum by any useful invention which may occur to him in the ordinary prosecution of his business.

Many of this class, and indeed many of every class of inventors, are persons who can no more help inventing than hens can help laying eggs. At present, if they are not rich enough to take out a patent—and patents are not to be had for nothing, though they are cheaper than they were—they have a strong inducement to keep their inventions secret, for fear they should lose the opportunity of some day patenting them; whereas, if there were no chance of their ever being able to do so, the sooner they offered the invention to the public or to somebody who would be likely to pay them for it the better it would be for them. There is now also an enormous quantity of time wasted by persons of this kind, from ignorance of scientific principles, and of what has been done before, in consequence of their not venturing to consult anybody who could give them information, lest he should get at their secret, and patent it before them. Independently, therefore, of the other evils of this secret and ignorant system of working out inventions, which is caused by men having the vision of a patent constantly before their eyes, there is no doubt that the mere saving of time uselessly spent, both in scheming after and in what we may call hoarding up inventions, would enable the inventors as a body to produce many more real novelties without neglecting their own business than they do now. In short, whatever class of inventors you contemplate, it seems to me perfectly visionary to doubt that there will always be sufficient inducement, of one kind or another, to make it quite as well worth their while to cultivate the power of inventing as any patent law can make it. And it will certainly not be the less so because the pecuniary inducement will no longer be different in its character from the rewards which all other men receive for their work and the skill required for performing it. It is not found that there is any lack of lawyers or physicians because the lawyer who wins or saves for his client an estate of 30,000*l*. a year by a clever cross-examination and demolition of a rogue, or carries a Bill in Parliament worth ten times that value to the company who employs him, only gets paid a single fee for it instead of having a grant of a portion of the profits of the estate or the railway for fourteen years; or because the doctor who saves a man's life is only paid the regular fees for his visits or his operation, and not by a royalty out of the patient's income as long as he lives. Neither is it to be forgotten that the feats of Sir Frederick Thesiger, Serjeant Wrangham, and Sir Benjamin Brodie, are never performed, as those of inventors often are, by accident, or by a lucky thought or observation, or as the result of a few experiments, or by the adoption of another man's ideas; but are only to be achieved after an expensive education, after many years of labour and experience, the early ones generally unprofitable, and the later only more profitable in proportion as their labour has become more valuable to their employers.

So much for the argument, that patents are necessary to encourage inventions. There is another, which is sometimes used, with quite as little regard to probability, and, indeed, to actual facts; viz., that if inventors were not protected by patents, they would protect themselves by keeping their inventions secret. The answers to this are obvious and conclusive: First, there are a vast number of inventions to which the word "secret" can have no application whatever, because the thing to be produced by the invention tells its own story. Watt could not have made secret steam engines, nor could you have electric telegraphs with a trick in them, which nobody could find out, except by going to the Patent-office, and reading the specification. A secret invention of a new lock, or clock-escapement, or of a screw for steam vessels, and thousands of other things which are patented, is an expression utterly without meaning. Secondly, of the inventions which are not from their nature impossible to be worked in secret,—such as new modes of manufacturing old things, which do not tell their own story—how many could be carried on in secret for any length of time, when it would better the interest of every other manufacturer to discover it? Does anybody believe that not one of all the workmen in a factory could be induced to reveal the secret for fourteen years? And even if the secret was kept for that incredible time, the world would be no worse off than if the invention had been withheld from them by a patent instead of a secret.

It is evident that the only case in which a man would have any chance of keeping a *process* secret—and that is the only kind of invention to which the term applies—would be where he has invented it himself, and where the important part of the operation or application can be performed by his own hands, or by those of a very small number of confidential persons, and not depending on machinery, which the maker of it can make again. And even these very rare and small exceptions do not really affect the question; because wherever a process of manufacturing really can be kept secret, that is now, notwithstanding the patent laws, much the best protection the owner of it can have. For if he patents it, anybody can read the specification, and pirate the invention, if he chooses to run the risk of being prosecuted; and the class of operations which can be performed by the patentee with a very few hands, and with very little machinery, are exactly those which can be also used in secret by other people with the greatest impunity. In the Great Exhibition we gave a medal to a Swiss watchmaker for a method of tempering balance springs, which made them better than any others that were submitted to us; and the process was a secret, no doubt it will be said, because there are no patents in Switzerland. But suppose there had been patents, and M. Lutz had been foolish enough to patent, and therefore to specify his process, there is not a watchmaker in the world who could not have used it as often as he pleased, without the smallest chance of the patentee being able to convict him. Indeed, it is very well known that patents for things which can be made by anybody in a small way, without much capital or machinery, are practically good for nothing as a protection (whatever they may be as an advertisement) of the patentee, on account of the impossibility of capturing the pirates, or of recovering even as much as the expenses of the capture if they are caught. And therefore it is that some manufacturers, though working with patents which theoretically give both a protection to them and also information to the public of the nature of the process, are very unwilling to let strangers see their works, on account of the facility it would afford them for carrying away and privately using what they have seen, and the difficulty of discovering such piracies. I am glad to be able to add, from good authority, however, that some of the manufacturers who are most addicted to this secret system, are getting beaten and undersold by others, who have adopted the opposite system of freely communicating to each other, and letting anybody see the improvements any of them may make. For all these reasons, I am satisfied that the apprehension of any loss to the stock of knowledge of the world in consequence of the abolition of patents, inducing or enabling inventors of new processes of manufacturing to keep such knowledge to themselves, is altogether visionary and unfounded. And so for the present,

I remain, yours faithfully,
E. B. DENISON.

P.S. "Cosmos" is very much mistaken in flattering himself that I wished to stop his writing against me, either "without a cognisance," or with. On the contrary, I shall be delighted to see such a champion of patentees prancing about the field every week. I hope that those whose protection he has undertaken are equally gratified with the spectacle. I can assure them I shall not interfere with it.

Ben Rhydding, Leeds, 29th August.

## PROCEEDINGS OF INSTITUTIONS.

**MELBOURNE ATHENÆUM, DERBYSHIRE.**—The foundation stone of this Institution was laid on Saturday, by Lord Palmerston, in the presence of a large concourse of spectators from various parts of Derbyshire and Leicestershire.

The Rev. Mr. **DEAN**, the Vicar of Melbourne, on the part of the Committee, explained that the object they had in view in the erection of the building was threefold: in the first place, to provide accommodation for an infant-school; second, for a savings-bank; and third, for a Mechanics' Institution. These were the chief objects the Committee had in view; but they were fully sensible that "except the Lord build the house, their labour is but lost that build it;" and therefore he asked the Company to join him in prayer that God would grant his blessing upon the building they were about to raise. The reverend gentleman having offered up a short prayer, a silver trowel was then handed to Lord Palmerston; and the stone having been lowered to its site,

**LORD PALMERSTON** said, Ladies and Gentlemen, it has afforded me great pleasure to assist in laying the foundation of so interesting a building as that which is to be erected on the spot where we now stand. It is indeed a building of peculiar interest, because it is designed to be, I may say, an epitome of the life of man, as well as an exemplar of the civilization and improvement of the age. It is to contain, in the first place, a provision for infancy in the form of an Infant-school; in the next place, a provision for the instruction and amusement of man in his maturer years, in the shape of a Mechanics' Institution; and lastly, in the form of a Savings-bank,—a provision for advanced and declining age. In former times the treatment of infants was far different from that which now prevails. Mothers considered—and in some other countries they still consider—infants as incumbrances, impeding their useful exertions, and the infants used to be scolded till they cried, and beaten till they ceased to weep. In some countries mothers who want to employ themselves in useful labour wrap their infants in swaddling-clothes, and hang them up on a peg, as you would do a hat or a great coat. Now, our improved civilization has taught us that we may provide for the care of infants, and at the same time begin to instruct their youthful minds. It is, indeed, not possible to hope that great information can be instilled into children of from two to six years of age, and it is possible, perhaps, that the knowledge which is given may not long survive the period at which it is communicated to them; but they may, at all events, acquire habits of obedience, order, and regularity; and habits we all know are most important objects of education—they are the most durable in their impression; and good habits thus given to infants in their earliest age must nesessarily contribute to their happiness and welfare in their future life. When, therefore, we establish an infant-school, we are not only assisting mothers by giving them the opportunity of following a more useful occupation, but we are laying a foundation for the good order of the community of which these infants are hereafter to be members. The advantage of Mechanics' Institutions are so well known, and so justly and universally appreciated, that it would be a waste of time, I may say, to dilate upon them; but, nevertheless it cannot be useless to bear in mind that these Institutions contribute not only to the intellectual pleasures of the working classes, but also conduce greatly to their worldly comfort and advantage. With respect to their pleasures, I may say that there are no pleasures really worth having but those which are connected with the intellectual faculties. Pleasures of another kind may, perhaps, be valued for the moment, but they leave no good after them, and they tend frequently rather to degrade and brutalize than to improve and adorn those by whom they are enjoyed. On the other hand, the pleasures of the intellect increase in intensity in proportion as they are enjoyed; and they elevate the persons who cultivate them in the scale of human beings. There is this remarkable difference between the times in which we live, and the times which have passed before us. We have, indeed, in these days great discoveries and inventions made, worthy of the intellectual progress of the people who now live. We have in these days invented railways which tend to facilitate communication between towns, provinces, and countries—which tend, as it were, to render Europe one great city, and confer on different nations those advantages of easy communication which heretofore were enjoyed only by the inhabitants of separate towns. That is a great improvement, a great invention, and likely to conduce much to the prosperity, the happiness, and the welfare of mankind. We have in these days applied the power of steam to the navigation of the wide ocean. We have thereby brought countries nearer to each other, which heretofore were separated by passages of many months, and accompanied by great perils and dangers. We have also in these days achieved one of the most splendid triumphs of human genius, because it was not the result of accident, but of laborious investigation and induction—I mean the invention of the electric telegraph—an invention which brings the most distant parts of the world within minutes of each other; and which will, probably, at no distant time enable us to hold converse with our fellow-subjects in India as quickly as has been done heretofore between parties in adjoining rooms. But, Ladies and Gentlemen, former ages also had their great and important inventions and discoveries. The magnetic needle, for instance, enables man, who before used to creep timidly along the shores of seas, to launch into the wide ocean with a certain security of attaining directly the object of his search—a great invention which laid the foundation of vast improvements in the existence of mankind. Former ages also invented the art of printing—an art the usefulness of which it would be childish for me to point out to any whom I have now the honour of addressing. Former ages, also, invented gunpowder—an article which, although apparently an instrument of rapid destruction, yet gives to civilization a security and protection against barbarism; and it may be safely affirmed that, if the Romans had had that implement of war, Europe would not have been overrun by those hordes of barbarians who involved the civilised parts of the world in darkness and ignorance for many centuries in consequence of their inroads. But although in ancient times there were men of great knowledge who invented those wonderful things to which I have alluded—not to mention men of science and literature who have never since been surpassed—yet in those times knowledge was confined to the few. Now, happily, knowledge is at the command of all; books for imparting instruction of every kind are accessible at a price which places them within the reach of every one; while Mechanics' Institutions enable the working classes to profit by the exertions, bodily and intellectual, of those who have been the investigators and acquirers of knowledge. The working man may now, without going many yards from his home, acquire that knowledge of distant countries which has been gained by adventurous travellers who have traversed burning deserts or encountered the perils of the stormy ocean—who have visited the Arctic regions, or gone to the extreme of the southern world. The mechanic has now the opportunity of acquiring the result of laborious exertions without ever stirring from his home. The mechanic has now, also, the means of applying to his own purposes all that knowledge which men of deep science have gained by laborious processes, whether in chemistry, or mechanics, or in any other branch of science, and he is enabled to profit at a small expense from the investigations which have been so laboriously pursued by others. The mechanic is also by these Institutions let into the secrets of Nature, the contemplation of which tends to elevate the mind. and while, on the one hand, it teaches every man how insignificant a portion he is of that great universe which is opened up to him, on the other hand it must also tend to render him more contented with his lot and more resigned to bear any evils which Providence in its wisdom may ordain him to suffer. The mechanic, in his small room, by the library which is now placed at his command, is enabled to ascertain the wonderful fact, that insects too small to be seen by the naked eye. are yet formed with all the complicated apparatus of larger beings; that although we cannot see them, they have yet joints, limbs, and veins, blood which circulates, and lungs which breathe: that they are constructed, although with a minuteness which is hardly conceivable by man, with all the elaborate contrivances which we find in the larger objects of creation. The mechanic, by means of Institutions like the present, is enabled to carry his mind into the most distant regions of the universe. He is enabled not merely to understand the wonderful machinery of that system of which this world forms a part, but he is enabled to carry his views further, and to know that there are visible to those who have the command of the wonderful telescopes and improved optical instruments of the day, 80,000,000 of suns, each of them as large, and some of them, in all probability, larger than ours, all of them surrounded by planets, and containing probably an indefinite number of beings, all the creation of the same great and inscrutable Power which made this earth. The contemplation of these things must, I think, raise the mind of the mechanic from worldly, low, and vulgar considerations, and tend to direct his mind with fervent devotion towards that great Being from whom he derives his present existence. Well, then, if these Institutions are advantageous to the middle age of man, so also is the savings-bank a valuable establishment for declining age. There is no maxim of life more valuable than this—that man should make to-day conducive to to-morrow; that he should be willing to forego the enjoyment, the temptations, the allurements of time present, for the purpose of laying up a store which will insure his comfort in time to come. That is a maxim no less conducive to his comfort and happiness in this world, than essential to his well-being hereafter. Those who act on this maxim will find themselves comfortable, wealthy, and respected; while those, who, on the other hand, are careless of to-morrow, and think only of today, who waste in riotous extravagance or needless pleasure those means which ought to be laid up in store for their future comfort and support, will be sure to lose the respect of their neighbours, and, what is a much greater loss, their own respect for themselves. Well, Ladies and Gentlemen, there is nothing more calculated to encourage these habits of foresight and providence than savings-banks; and I trust that the effects of establishing one in this town will be as beneficial as they have been proved to be in other places where similar institutions have been established. I trust that the working man, who, by his skill and industry, is now in receipt of ample wages, instead of squandering them, as many may now be tempted to do, by the want of any proper means of accumulating them—instead, I say, of squandering in dissipation, or, what is worse, in drink or momentary indulgences, a large portion of his earnings, will be induced to lay up a portion of them for the future support of himself and family; and depend upon it, that when once the habit is acquired, when once a man begins to feel that by providence and foresight, by laying up day by day and week by week, he is accumulating a store which will stand him in stead when the rainy day comes—when age and infirmity prevent him from working with the same activity as heretofore—when once that habit is gained, he will find it a source of pleasure as well as of advantage; he will find it a source of pride to himself to know that he has been accumulating a little store for himself; and that he will be a far happier, as well as a far more respected member of society, than he would have been had he squandered daily and weekly in riotous extravagance those means which ought to have been more advantageously laid by. I look, therefore, on this triple Institution as one, perhaps, of greater interest than any institutions that were ever before brought together under one roof, because it combines a care for man from his infancy to his most advanced age—because it provides those means which the improved civilization and greater knowledge of the times has pointed out as useful to all classes of the community. I trust that this day will be one auspicious to Melbourne. I trust that every man and child who now hear me will find in the result of this Institution benefits far greater, perhaps, than many may have anticipated, but benefits which have always attended similar Institutions wherever they have been adequately supported. There is one other topic on which I may, perhaps, be permitted to say a few words to you. There is one thing wanting to complete the Institutions of your town—I mean a school for the education of girls. There is an excellent boys' school, but there is not yet an establishment of the same nature for girls. Now, Gentlemen, it is well known that the education of women is of the greatest importance to society. Men may be, indeed, the rough stones of which the fabric of society is built; they may form the strength and resisting portion of the fabric; but women are the finer cement without which those rougher ingredients will not find order or consistency, and without which there can be no beauty, no form, no lasting and useful enjoyment. But, Gentlemen, we all know the important influence which is exerted by women upon the welfare of mankind, whether it be in the capacity of daughters, sisters, wives, or mothers; and therefore, independently of any regard for the fair sex—a regard, however, which I am persuaded all whom I am addressing feel in the strongest degree—the most selfish considerations, a single regard for ourselves, a regard for man abstractedly and independently of woman, ought to lead us to endeavour to mould and educate the rising portion of the female community, that they may be as well adapted as possible, by good training and instruction, to perform the various duties of life in the capacities of daughters, sisters, wives, and mothers; and therefore, although it forms no part of the Institution which is now about to be established, I commend to your anxious and earnest consideration the establishment likewise of a girls' school at Melbourne. I beg again to express to you the high gratification which it has afforded me to take part in this most interesting ceremony, and I conclude with wishing every possible prosperity, not only to the Institution itself, but to the town of Melbourne, of which it is destined to be not only an ornament but an honour. (Loud and repeated cheers.)

Immediately after the ceremony of laying the stone, about 150 ladies and gentlemen sat down to a cold collation, in the National School-room. Mr. J. T. Cantrell, County Court Judge, presided,—supported by Lord and Lady Palmerston, Lord Cowper, the Hon. W. Cowper, M.P., the Hon. Mrs. Lamb, the Rev. Mr. Dean, Mr. Moss (the Mayor of Derby), and Mrs. Moss, &c.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 26th August, 1853.*

*Dated 10th August, 1853.*

1857. G. Parsons, West Lambrook, Somerset—Steam-engines and boilers.
1859. J. G. Taylor, Glasgow—Desks, work-boxes, &c., and fittings thereof.
1863. S. Hall, 16, Chadwell-street, Pentonville—Furnaces.

1865. D. Mushet, Coleford, Gloucestershire, and E. Weale, Shiffnal, Shropshire—Propelling.

*Dated* 11*th August.*

1867. J. B. Finnemore, Easy-row, and E. D. Chattaway, Camden-street, Birmingham—Registering persons entering omnibuses, buildings, &c.
1869. T. K. Hall, Crewe, Cheshire—Forge-hammers.
1870. R. F. Brand, South-terrace, Willow-walk, Bermondsey—Fire-arms and ordnance.
1871. H. P. Stephenson, Thurloe-place, West Brompton—Suspension-bridges.
1873. J. D. Dunnicliffe, Hyson-green, Nottinghamshire, and J. Woodhouse Bagley, Nottinghamshire—Manufacture of lace fabrics.
1875. T. F. Newell, Cloak-lane, Queen-street, Cheapside—Machinery for numbering pages of books, &c. (A communication.)
1877. H. Lee Pattinson, Scotts' House, West Boldon, Gateshead—Recovery of sulphur from alkali waste.

*Dated* 12*th August.*

1878. S. Adams, West Bromwich, Staffordshire — Supply of water to steam-boilers, &c.
1879. L. Van Caneghem, 6, Conduit-street, Regent-street—Fastening corsets.
1880. J. Strong, Smethwick, Staffordshire—Furnaces for smelting iron-stone, and ores.
1881. T. Turner and J. F. Swinburn, Birmingham—Sights for rifles.
1882. E. and R. Lavender, Deptford—Materials for firelighters.
1883. R. Holliday, Huddersfield—Lamps and lanterns.
1884. R. A. Brooman, 166, Fleet-street—Fuel. (A communication.)
1885. R. A. Brooman, 166, Fleet-street—New compounds for mouldings, frames, &c. (A communication.)
1886. R. A. Brooman, 166, Fleet-street—Impressions from dies, &c. (A communication.)
1887. R. A. Brooman, 166, Fleet-street—Castings in malleable iron. (A communication.)
1890. W. Littell Tizard, Aldgate—Thermometers, &c.
1891. W. Aldred, Manchester, and R. Fenton, Prestwich, W. Crone, Salford—Separating wool from cotton, &c., fabrics.
1893. H. Wareham, Fenton, Staffordshire—Inlaying earthen vessels.
1894. R. S. Bartleet, Redditch, Worcestershire — Apparatus used in sewing.

*Dated* 13*th August.*

1895. F. Lipscombe, 233, Strand—Evaporating.
1896. J. C. Boond, Manchester—Improvements in Jacquard apparatus.
1898. G. Peel and R. Brownhill, Manchester — Air-pump buckets, and steam-engine valves.
1899. C. W. Hoskyns, Wroxhall, Warwickshire—Steam to cultivation.
1901. J. and J. E. A. Gwynne, Essex-wharf, Essex-street—Manufacture of fuel.
1902. J. and J. E. A. Gwynne, Essex-wharf, Essex-street—Preparation of beet-roots for sugar manufacture.
1903. J. H. Johnson, 47, Lincoln's-inn Fields—Dyeing, and machinery for same. (A communication.)
1904. J. H. Johnson, 47, Lincoln's-inn Fields—Manufacture of gutta percha. (A communication.)
1905. E. J. Scott, Glasgow—Boots and shoes.
1906. H. Hughes, Cottage place, Middlesex—Method of producing cut and fancy patterns in fabrics.

*Dated* 15*th August.*

1908. A. Dalgety, 76, Florence-road, Deptford—Rotatory steam-engines.
1909. G. E. Dering, Lockleys, Herts—Electric telegraphs.
1910. A. Douglass, Norwich—Machinery for stitching, &c.
1911. R. A. Brooman, 166, Fleet-street—Machinery for reducing wood, &c., to pulp for paper-making.

*Dated* 16*th August.*

1913. B. Rankin, 1, College-street, Islington—Propelling.
1915. J. Martin, Liverpool—Corn-mills.
1917. P. Foxcroft, Salford—Doubling machinery.
1919. W. Hunt, Lee-brook Chemical-works, Wednesbury, Staffordshire—Manufacture of sulphuric acid.

APPLICATION WITH COMPLETE SPECIFICATION FILED.

1945. J. W. Cochran, 17, Gower-street, London—Machinery for crushing, grinding, &c., ores. Aug. 20, 1853.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed August 27th*, 1853.

498. James Murphy, of Newport—Improvements in truck waggons, or vehicles for railway purposes.
502. George Duncan, of Chelsea—Improvements in steam boilers.
503. Peter Armand le Comte de Fontainemoreau, of 4, South-street, Finsbury—Improvements in drying cigars. (A communication.)
526. Marcel Vetillart, of Le Mans, France—Improvements in drying yarns.
545. Robert Crail Ross, of Edinburgh—Improved machine or instrument for cutting files and forging metal.
547. Joseph Sparkes Hall, of Regent-street—Improvements in cutting out parts of boots and shoes.
591. John James Alexander Maccarthy, of Howland-street—Improvements in gunnery and projectiles, with powder for the latter which are adapted for muskets, rifles, pistols, and heavy cannon, for field-pieces or forts, batteries, ships of war, and other vessels.
624. Auguste Edouard Loradoux Beilford, of Castle-street, Holborn—Improvements in machinery for cutting standing crops, and gathering the same into sheaves or bundles. (A communication.)
761. Louis Michel Lombard, of Paris—Improvements in obtaining motive power.
803. Francis Steigewald, of Munich—Improvements in the manufacture of glass and porcelain.
805. Francis Steigewald, of Munich—Improvements in heating furnaces.
846. William Moseley, of Cumberland-terrace, Regent's park—A new method of railway traction, to be called a pony railway.
1155. Jacob Brett, of Hanover-square—Improvements in electric telegraph apparatus. (Partly a communication.)
1273. John Henry Johnson, of Lincoln's-inn Fields—Improvements in the construction of pipe and other junctions. (A communication.)
1308. Alexander Killer, of Dundee—Improved machine for the manufacture of confections, including all kinds of comfits known by the trade as pan goods.
1451. Jules Dehan, of Paris—Improvements in the manufacture of yarn, and fabricating articles therefrom.
1452. Jules Dehan, of Rue Pigale, Paris—Improvements in the manufacture of woven fabrics, yarn, cordage, ropes, paper, and pasteboard, by the application of a material not hitherto used in Great Britain for such purposes.
1456. John Elliott, of Oak-lane, Limehouse, and John Br[illegible], of the same place—Improved machinery for making rivets, spikes, and screw-blanks.
1472. Joseph Warren, of Maldon—Improvements in ploughs.
1482. William Hall, of Aberdeen — Improvements in ship-building.
1509. Richard Cornelius, of Old Town-street, Plymouth—Improvements in the construction of churns for producing butter.
1523. Francis Huckwale, of Choice-hill, near Chipping Norton—Improvements in hand-hoes.
1524. William Geeves, of New Wharf-road—Improvements in the manufacture of bricks.
1545. Henry Goodall, of Derby—Improved machinery or apparatus for grinding or levigating various substances.
1549. John Emanuel Lightfoot, of Accrington—Improvements in the manufacture of certain colouring matter, to be used in dyeing and printing.
1563. John Henry Johnson, of Lincoln's-inn Fields—Improvements in turning over the leaves of books, music, and engravings, and in the apparatus for effecting the same. (A communication.)
1567. John Patterson, of Beverley, Yorkshire—Improvements in machines for reaping and mowing corn, grass, and other crops.
1602. Nathan Pollard, of Bowling, Yorkshire—Improvements in machinery for drawing wool and other staple.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| August 25 | 3502 | Improved Joiner's Brace. | Joseph Cooper | 124, Lionel-street, Birmingham. |
| „ 26 | 3503 | Improved Pin-case. | Stephen Van | 1, Greville-place, Kilburn priory. |
| „ 30 | 3504 | Needle-casket. | W. and W. Field | Redditch, Worcestershire |
| „ 31 | 3505 | Cylinder for Single-acting Steam-engine. | Cox and Wilson | Oldbury. |

# SOCIETY OF ARTS.

FRIDAY, SEPTEMBER 9th, 1853.

## MEETING OF COUNCIL.

*Wednesday, Sept. 7th,* 1853.

At a Meeting of Council held on the 7th instant, the following Institution was taken into Union:

288. Andover, Library and Institute.

## NOTICE TO INSTITUTIONS.

The Council has much pleasure in giving notice to the Institutions in Union that the undermentioned Publishers of Books and Maps,—among whom are a large number of the most eminent firms of the United Kingdom,—have agreed to supply their publications, at reduced prices, to the Society of Arts, for the use exclusively of the Institutions in Union.

The Council will shortly forward to each of the Institutions in Union a circular, setting forth the respective rates of reduction, varying from 25 to 50 per cent. (averaging nearly 40 per cent.), which the several Publishers have agreed to allow; and also the conditions, and modes of proceeding, to be observed by the Institutions, in order to avail themselves of the advantages thus offered for the purchase of Books and Maps at considerably reduced prices.

List of Publishers who have agreed to supply to the Society of Arts, at reduced rates, Books and Maps for the Institutions in Union with this Society:

Bailliere, H.
Baldwin, R.
Bell, G.
Bentley, Richard.
Bentley, Joseph.
Betts, J.
Bickers and Bush.
Black and Co.
Blackwood and Sons.
Bohn, H. G.
Bosworth, T.
Bogue, D.
Cash, W. and F. G.
Cassell, J.
Chapman, J.
Churton, E.
Churchill, J.
Clark, T. and T.
Collins, H. G.
Collins, W.
Constable and Co.
Cornwell, J.
Cradock and Co.
Crossley.
Crutchley, G. F.
Darton and Co.
Fullarton, A., and Co.
French, W.
Groombridge and Sons.
Gilbert.
Hamilton, W.
Hamilton, Adams, and Co.
Hatchard, T.
Hogg, J.
Hope and Co.
Home and Colonial School Society.
Hughes, W.
Hurst and Blackett.
Ingram and Cooke.
Johnston, W. and A. K.
Longman and Co.
Macclesfield, M.
McMillan and Co.
Masters, J.
Moxon, E. C.
Mozley, J. and Co.
Murray, John.
National Society.
Newby, T. C.
Nisbet and Co.
Oliver and Boyd.
Pamplin, W.
Parker, J. H.
Partridge and Oakey.
Pickering, W.
Religious Tract Society.
Redfern, J.
Ridgway, J.
Rivingtons.
Saunders and Ottley.
Scott, Adam.
Sporr, E. and F. N.
Sullivan, R.
Sutherland and Knox.
Virtue and Co.
Whyte, W., and Co.
Williams, J.
Wyld, J.

A List of Publishers of Music, who have agreed to allow similar reductions, will shortly be published.

# CHINA-STONE AND CHINA-CLAYS OF CORNWALL.

***An Essay on the China-stone and China-clays of Cornwall, with a description of some Mechanical Improvements in the mode of preparation of the latter.***

BY MR. H. M. STOKER, OF ST. AUSTELL, CORNWALL.

From the Twentieth Annual Report of the Royal Cornwall Polytechnic Society.

*(Continued from page* 501.*)*

### PART II.

The China-clay or kaolin of Cornwall was first brought into notice at a very late period, though the material itself has been long used; in fact, not only were the Chinese well acquainted with it, both in a raw and a manufactured state, from the most remote ages, but it is also probable, from the interesting evidences lately brought to light through the industrious exertions of Mr. Layard, and from other sources, that the Egyptians knew somewhat of its uses.

When obtained by Mr. Cookworthy, in 1768, from the Lescrowse and Trethose clay-works, in the parish of St. Stephens, a large supply was at once demanded for the Staffordshire potteries, which has gradually increased till the present time; the average annual export of last year, which I have been enabled to offer my readers through the kindness of the most influential shipping-agents in the neighbourhood, is as follows:

| | | |
|---|---|---|
| At Charlestown . . . | 40,000 | tons of China-clay. |
| „ Par . . . . . . | 10,000 | „ „ |
| „ Pentewan . . . . | 18,000 | „ „ |
| „ other harbours . . | 12,000 | „ „ |

Forming a total of 80,000 tons.

From the little attention paid to former exports of this article, I have been unable to form an accurate estimation of them, though some idea of the increase may be gleaned from the following estimates of the value of the exports of the manufactured article, to the various countries with which England has any commercial relations;

| | | |
|---|---|---|
| Shipped from Stafford in | 1835 . . . | £280,000 |
| „ „ | 1837 . . . | 560,000 |
| „ „ | 1841 . . . | 600,759 |
| „ „ | 1851 . . . | 1,210,000 |

while adding to this the exports from Derby, Worcester, and other potteries, will give a total of £2,150,000 shipped during the past year; in addition to which, of late years, a considerable amount of crude kaolin has been exported to every pottery on the Continent, and also to those of our inquiring American brethren, while a small portion has been used for bleaching.

Kaolin is found intermixed with quartz and scales of mica, in most valleys contiguous to the decomposing hills of the primary strata of our county, and is not, as far as is at present known with regard to China stone, confined to any particular district, being now obtained or obtainable, though of different qualities, on the south-western sides of either of the granite districts; yet, of course, poorest near those beds of China-stone which I before described as free from most deteriorating substances, as in the parish of St. Stephens.

It exists in these beds or stopes, as they are designated, as an amorphous whitish-blue opaque powder; which from the softening influence and rainy character of the south-westerly winds, are most frequent in valleys situated on the same aspect; often lying on the contiguous borders of the granite and killas, clay-slate, grawacke or transition strata, by which this is surrounded; where, being exposed to the action of lodes and co-existing springs, on the occurrence of the slightest convulsion, it has slid to the adjacent valleys, where its presence is indicated by the generally smooth and flattened appearance of the surface; by the vegetation on it, which is often luxuriant, especially if the clay contain an excess of potash; and by the number of springs to which it gives rise in the immediate vicinity, their height above the level of the sea being necessarily limited by that of the valleys in which the clay is deposited.

The character of the clay very much assimilates to that of the granites from which it has been formed by the disintegrating process to which I referred while speaking of the formation of China-stone, not only as to the quantity obtainable from a given amount of clay stope, but also as to the purity of the article and its whiteness, the whitest clay being formed from that granite which has the whitest felspar, and is most free from iron, the presence of this giving the manufactured wares an appearance termed "foxy;" while lastly, the amount of mica scales, which give to them their tenacity or strength of body, considerably influence the character and value of the clay; so that, as a general rule, we can form a very good diagnosis of the character of the clay by an examination of the granite from which it has been formed; and in doing this I would advise the use of a good microscope, by which only the clay producer can hope to obtain an accurate knowledge of the value and purity of our clays.

In the model which I have sent for the inspection of the Committee of the Royal Cornwall Polytechnic Society, I have employed drainage as an additional means of aiding the drying of clay, by forming a kind of filter of the clay-pan. A substratum of large pebbles, increasing in depth from behind forwards, but with the surface level, is first laid down above this coarse gravel; between which and the clay to be dried is a thin layer of fine sand; through this the water quickly runs to the corner, towards which the inclined bottom is made to fleet, which communicates with the country by means of a launder, over the inner end of which is placed a wire gauze grating. By the employment of these, from experiments I have made, I have ascertained that the clay can be dried thrice as rapidly as by the ordinary methods; in addition to the introduction of which I should recommend to the notice of parties employed in these operations the propriety of placing these pans as closely together as possible, so that on the occurrence of heavy showers, of long duration, or in the heavy dews of the nights of summer, the clay may be kept from this accession of moisture by some cheap covering, as these obstacles very much increase the difficulty of drying clay in any given period.

The kaolin is by this means only partially deprived of moisture, in order to effect the complete removal of which it is taken from the pans, where it has been allowed to remain for from three to four months, to the drying-grounds, on the adjoining hills, in summer, in cubic blocks about one foot square. In order to effect its removal from the pans, a number of parallel incisions are made the whole length of the pan, in one direction, by means of a perpendicular knife attached at right angles to a long handle; these long blocks are then divided transversely by men, who, with spades, throw them on a board, on which they are carried by women and boys to the sandy drying-yard, where they soon become perfectly dry and white; but as this can only be done in summer, and not even then if a wet season, it has become necessary that recourse should be had to other means: those hitherto employed have all required the use of a fuel obtainable only from Newport or some distant coal tract, and hence requiring considerable outlay; so much so, in fact, that but few persons are able or willing to make use of it; the heat in these cases is applied by means of a large kiln, or by passing the clay over a heated drum, neither of which methods could be made available in the return of several thousand tons of clay annually.

But it occurred to me that the deleterious floods of the winter, or the wind on the adjoining hill, might be rendered available as a motor power, provided it could be employed in the construction of a kaolin drying-machine. The success of my attempts will be best learned by a few turns of the handle of the accompanying model, made and invented by the author; by a machine twelve times the size of the model, two tons of clay can be dried completely every five minutes: it consists of a number of perforated fans, having on them shelves similarly peforated, or made of wire gauze, which are kept rotating 200 times a minute, or faster, if necessary, by the four attached multiplying-wheels. These wheel-fans have six perpendicular screw-like arms, on each of which are a number of transverse shelves for the carriage of the clay, where, from the rapid motion of the wheel, and the proposed currents of air it causes to be thrown against the clay, it rapidly becomes dry.

The fact of doing away altogether with fuel, and the substitution of a power which can be obtained with the greatest ease, on the occurrence of a very rainy season, render it at once a cheap and advantageous substitute, either for the labour at present employed or for the still more expensive fuel.

The junks of clay, after being again collected, are now piled away in sheds, under a number of thatched gates or reeders; or are placed in some sheltered spot, so that they may, nevertheless, have a constant current of cold dry air surrounding them, and be at the same time kept from rain. When required for exportation, these square blocks are scraped by a number of the clay women, who, armed with their "Dutch Hoe"-like instruments, as they surround their scraping-tables, present a rather formidable appearance; after this the clay is piled in wagons to be sent from one of the nearest ports, or is packed in a number of small casks, each capable of holding about half a ton, in which it is sent off.

The prices of these clays vary very much with the quality of the article, though those of a superior stamp seldom alter, as they have held their price for the last ten or fifteen years, and always command an excellent sale in the market at from 36*s.* to 46*s.* per ton; while those of an inferior quality may be procured at any price below this down to 17*s.* per ton; varying with their purity, hardness after calcination, degree of whiteness, both in and out of water; and lastly, the degree of shrinking they undergo on calcination or fusion.

Having already entered, as fully as the limits of the present essay will permit me, on the subject of the uses of kaolin, further information on that head must be dispensed with; but before concluding, I must introduce to your notice a few facts, bearing directly on the influence the preparation and production of this article exercises on this, the central portion of the county. The first and most important of which is the number of people employed in its preparation, and the amount of capital expended annually in labour; next, I shall show the amount of the cost of land dues; thirdly, that of land carriage, which will necessarily afford additional aid to the labourers in the vicinity, as the whole of this work is executed by a number of small farmers, each of whom is generally provided with his wagon and team of from three to four horses. The cost of cooperage and quay dues is next on the list, forming a total of 240,500*l.* spent in the preparation and production of this article in this county alone; but it should also be recollected that no less than 80,000 labourers are employed in the neighbourhood of the Staffordshire potteries, and 20,000 more in those of Derby, Worcester, Wales, and Bristol, in its subsequent manufacture; for which, prior to its arrival in or at either of these districts, a sum of 12*s.* per ton, for carriage by sea and canal, is entailed; forming a total of about 300,000*l.* spent on China-clay and stone before they arrive in the potteries, where an immense amount of capital is again spent in their manufacture.

| | Yearly Expenditure. |
|---|---|
| Labour, 7,200 men, women, and children, at 1*s.* 6*d.* per diem . . . . | £197,100 |
| Carriage of clay and stone to one of the nearest ports, at average price . . . | 22,000 |
| Dues to landowner . . . . . . | 14,000 |
| Dues to proprietors of harbours . . . | 2,500 |
| Cooperage on best clays . . . . | 5,000 |
| | £240,600 |
| Land and canal carriage, at 12*s.* per ton | 58,800 |
| | £299,400 |

Having thus, as briefly as possible, stated the chief facts with which I am acquainted relative to the history, preparation, and commercial importance of these articles, and pointed out the advantages to be derived, and the field of improvement which is offered for the contemplation, study, and enterprise of Englishmen, by substituting machinery for the great amount of manual labour and cost, at present necessarily entailed by the existing want of information on this subject, I must conclude by again calling attention to the distance of these beds from the potteries and their surrounding beds of fuel, and suggesting that substitution of the transfer of materials, at a subsequent period, may considerably alter the present state of the central portion of the county, and with it the price of the various articles of pottery, so necessary to our comfort and convenience.

The kaolin of both Devon and Derbyshire is of good working quality, but can by no means compare with that of our county, either for whiteness or strength; it contains 60 of alumina, 20 of silica, and 20 of potash (Wedgwood); and to this peculiarity of constitution (excess of silica) is due its property of being infusible and unchanged, at the highest temperature. It is extremely tenacious of moisture, and hence one great difficulty in its preparation: to be hereafter discussed.

The clay-beds, or stopes, are formed by small irregular crystals of quartz, the edges of which are by no means so well marked as in the granite, nor is their opacity so great: the mica is apparently unchanged, consisting of silicic acid, potash, and alumina, in the form of double silicate; while the felspar of the granite or China-stone, by the loss of its potash, has become converted into the amorphous powder I have just described; a singular instance of the effect of slight natural chemical changes giving rise to the formation of two such dissimilar bodies, when fused, as biscuit China, white, glassy, sonorous, and translucent; when, if the disintegrating process have but just overstepped this limit, we find, on fusion, a brick-like mass, white, opaque, adherent to the tongue, tenacious of moisture, and earthy on fracture. There are, however, as I before stated, many and varied intermediate productions from the pasty pipe-clay or tile to porcelain or glass, which is but another form of a fusible silicate. The clay stopes are oftentimes rendered useless by the presence of some iron lode, which causes them to become loosened in texture and reddened; the stope is then termed "brawny," and this has to be thrown aside as useless.

Having thus briefly given a general outline of the nature, composition, and history of these clays, I shall proceed to the notice of the mode of preparation of them in this county, which, though simple in theory, requires much care and attention in its execution, and consists essentially in the separation of the quartz from the mica and kaolin, and the subsequent collection of the latter. The execution of this process in any of the extensive works in St. Stephen's parish, one of which would cover from ten to thirteen acres of ground, and from which 2,000 to 3,000 tons are annually raised and fitted for the market, forms a curious and interesting spectacle of whitewashed happy industry for the contemplation of the traveller during the months of summer.

Distant from five to eight miles from St. Austell, situated in the centre of barren, rugged, heathery wilds, enclosed by stone walls, and bounded on every side by cold, bleak, and rugged hills, these works have a very picturesque appearance. In one part of them may be seen from thirty to forty men, boys, and women, who, with their white bonnets, white aprons, and sleeves, carry the still whiter clay, in large junks, to the surrounding hills or drying-grounds, to be exposed to the warm rays of the sun, the dry winds, and the bleaching power of the air. In another may be seen other parties scraping the clay prior to its being packed in casks, to be sent to various parts of the Old and New World; circular or oval pits and square pans are lying in all directions, their continuity here and there disturbed by one or two water-wheels in incessant motion, or piles of dried clay covered with reeders or lying in sheds; while at one extremity of the work may be seen a number of men and boys employed in excavating the clay stope, removing the overburden, or shearing the stope to wash away its clay; the sand at the same time being removed to the drying-ground by means of a tram-road, the wagons passing along which are worked by the aid of water power; while over-head launders, attached to pumps for various purposes, seem to form a skeleton roof to the whole.

The beds of clay stope are exposed by the removal of the over-burden, which varies in thickness, in some places lying but a few feet from the surface; while in others the only bed fit to be washed is placed at a depth of from ten to twenty fathoms from the surface. The removal of the superimposed earth is effected by a number of men with their pickaxes and shovels, which, by their barrows, they transport to the adjacent rugged country, so as to render it smooth and level, in order to form drying-fields for the summer. While this is in progress, the clay stope, over the top of which flows a small stream of water, is being excavated by another set of men, which, as the water passes through, has the clay suspended in it by the treading action to which the stope is subjected by means of the large boots, often seven pounds weight, with which the clay streamers are supplied; the sand is thus separated from the clay and mica, which are carried on by the water, and the sand is then carried by rail or carted to the top of the work, whence it is taken to be spread over the drying-grounds, or is thrown into the pits and pans.

The water to be supplied to the clay stope should consist of two-thirds of spring to one-third of rain-water, this mixture causing a deposit of the suspended clay much more readily than any other. Great attention is often necessary in this part of the process, as from an excess of rain-water it is often requisite that it should be saturated with some earthy base. Common alum is at present used for this purpose; though any other cheaper salt would answer the purpose, as it is only necessary to saturate the water fully with earthy bases, when the clay speedily becomes thrown down—a law not generally known.

As a substitute for this, I have at times had recourse to finely-ground peat, or wood charcoal, which, thrown over the surface of a pit, on which it floats, by a process of angular attraction and repulsion, causes the clay to be deposited, even from distilled water, far more readily than by the addition of any soluble earths—as may be demonstrated with ease by experiment in two or three tumblers; but as I am rather in advance of the water in which I left the clay and mica suspended at the bottom level of the clay-work, I must return thither, till by the aid of wooden or iron pumps, from forty to eighty feet deep, worked by a powerful water-wheel, this milky-looking fluid is elevated to the level of the large mica launders, where the clay, being lighter than it, leaves it deposited in these inclined pits, which are generally three or four in number, placed in tiers, with a slight elevation at the upper end of each. They vary in length from ten to twenty feet, are generally three feet in breadth, and six or nine inches deep, though both the number, size, and degree of inclination vary with the size and rapidity of flow of the shear of water, though no less than with the amount of mica contained in the stope. In some clay-works, the shear is so large that most of the mica is carried on with the clay, so that it possesses when fused a greater degree of tenacity, though of an inferior quality as to whiteness, plasticity, &c. In the separation of the best clays, these pits require that the motion of the shear through them should be slow and equable, the shear of small size, and the launders should be tapped or cleared out once in every six or seven hours—a careful attention to which well repays any amount of labour in the production of a good article. That portion of the mica collected in the first of these launders often being mixed with its scales and crystals of hornblende, or diallage, is thrown aside as useless, while that collected in the others is generally sold as a second quality clay.

The clay water, having left the mica, now flows on to a large circular or oval collecting-pit, thirty or forty feet in circumference, and from six to ten feet deep, where the clay subsides, forming an under stratum of the consistence of cream, the supernatant water flowing off from the top of the pit until it is filled. As soon as this happens, the clay is allowed to pass out by a trap-hatch to the pans below it; or should there be none at this level, recourse is had to the pumps, by means of which, and attached launders, the clay is passed to the drying-pans in any portion of the work. Of these, there should be from ten to twelve, capable of holding from forty to fifty tons, to each large collecting pit; they have been made till lately on any part of the adjacent ground, frequently on that covering the clay bed, where the surface, after being levelled and covered with fine loose gravel, is hedged in by walls of granite, the joints of which, as well as those of the pits, are rendered impervious by interposed moss: they are generally from twenty to forty feet square, and two feet deep. The pans, when two-thirds filled with the clay, are thus exposed to the heat of the sun or the dry winds of March, to the aid of which alone the proprietors of the majority of these works have hitherto had recourse.

## LIBRARIES IN THE UNITED STATES.

By a return made to Congress, it appears that there were, in 1851:

| | Number. | Volumes. |
|---|---|---|
| 1. State Libraries | 39 | 288,937 |
| 2. Social Libraries | 126 | 611,334 |
| 3. College Libraries | 126 | 586,912 |
| 4. Students' Libraries | 142 | 254,639 |
| 5. Libraries of Academies and Professional Schools | 227 | 320,909 |
| 6. Libraries of Scientific and Historical Societies | 34 | 138,901 |
| 7. Public School Libraries | 9,505 | 1,552,332 |
| Total | 10,199 | 3,753,964 |

1. *State Libraries* include those of general government, and of the educational departments, and those of the State Courts.—Almost all the States in the Union have organized State Libraries. Those which have not possess collections of books, which will, ere long, serve as the foundations of such Libraries. These Libraries are composed, to a great extent, of public documents of the general and State governments, with works on statistics, political economy, history, &c. Some of them, as the Library of Congress, the New York State Library, &c., take a much wider range, and are extremely valuable collections for general reference.

2. *Social Libraries* include Athenæums, Lyceums, Young Men's Associations, Mechanics' Institutions, Mercantile Libraries, &c.—These Libraries are generally composed of popular works for reading rather than for reference; but among them are many of the best collections in the country. We think that any one, looking over the catalogues of these Libraries, would be surprised and gratified to find them generally so well selected.

In some States almost every town has, under some name, a Social Library. Most of these collections, it is true, are very small, containing less than a thousand volumes; but there are doubtless a great many, far more considerable in size, which have been unintentionally overlooked.

3. *College Libraries* (exclusive of Student's Libraries).—These Colleges are mostly eleemosynary institutions. Their Libraries are frequently the chance aggregations of the gifts of charity; too many of them discarded, as well nigh worthless, from the shelves of the donors. This is not true of all our College Libraries; for among them are some very important collections, chosen with care and competent learning, purchased with economy, and guarded with prudence,—though ever available to those who wish to use them aright.

4. *Student's Libraries*, in Colleges, Professional Schools, Academies, &c.—The societies formed by students in these seminaries of learning, for mutual improvement in debate and composition, for the most part possess Libraries. These are generally useful collections of books of a popular character. Sometimes (in Yale College particularly) they are large, well selected, and admirably arranged and kept. Dust seldom gathers on the books in such collections.

5. *Libraries of Professional Schools* and *Incorporated Academies* include Theological Seminaries,

Law Schools, Medical Colleges, and Military Academies, as well as high schools, generally termed "Academies." The Professional Schools, several of them, possess the best special Libraries in the country. These Institutions (particularly the Theological) are so frequently connected with Academies, that it was found most convenient to group them together.

6. *Libraries of Learned Societies*,—Scientific, Literary, and Historical.—These Libraries are mostly composed of the transactions of similar societies and of periodicals, which contain the current records of science and letters. They have been mostly procured by donation and exchange. Some of the collections are extensive and important. The Historical Societies are doing great service in gathering and guarding the precious memorials of the early annals.

7. *Public School Libraries*.—Several of the States have taken great interest in supplying every township and school district with a Library. Other States have commenced such collections, and it is to be hoped that they may be greatly multiplied. They are not intended for pupils alone, but for all the population of the district or township to which they belong. They are composed of valuable books, designed and adapted to communicate useful knowledge in a popular way, and to cultivate all the higher elements of character. They are in continual use, and it is impossible to over estimate their beneficial influence.

Another class of Libraries, the statistics of which could not be collected readily, comprises Sunday-school Libraries. The aggregate number of books which they contain is very great. These books, though mostly for juvenile readers, are always of a moral or religious tendency, and they have vast influence in forming the intellectual as well as the moral character of the people.

## LIVERPOOL COLLEGIATE INSTITUTION.

Whilst public attention is eagerly turned to the subject of education, with a view to its extension among the masses, and whilst all branches of science are now being expounded in a popular and easy method, the study of the law can scarcely be said to have awakened from its inanimate state. One branch in particular, directly concerning individuals not connected with the profession, has never been taught in this country as a distinct system and in a practical method. *Commercial* law has long formed a subject of special instruction in Continental Universities. In Paris, professorships of mercantile law were established by Government as early as 1809; and there, and at the other Universities of France, advocates, magistrates, consuls, and vice-consuls are required to receive regular instruction in that branch of law. This portion of the law comprises not only the principles involved in all those multitudinous mercantile disputes which are adjudicated in the Common Law, Equity, and Admiralty Courts, but also those legislative enactments which have a bearing on, or directly affect, our commerce and shipping. It is easy to conceive how important it would be, therefore, to afford to the mercantile body increased facilities for acquiring a knowledge of a branch of law so nearly touching their interests, *and by means of which knowledge so many unnecessary disputes and litigations may be avoided*. The Council of the King's College, London, appreciating the wide interest expressed by the mercantile classes in the reform of our commercial law and judicial system, have taken the initiative in this matter by the appointment of Mr. Leone Levi, whose name is already so well known in association with the subject, to deliver, at the College, Lectures on the entire Mercantile Law of the United Kingdom, and of those countries with whom our commerce is carried on, the first course of which has just been concluded. Believing that the dissemination of a popular knowledge of the law, as bearing on mercantile pursuits, would be equally useful in the second commercial town of the empire, Mr. Leone Levi has undertaken to give at the Collegiate Institution, during the London recess, a Course of Lectures on Commercial Law. The merchants and traders of Liverpool, it is to be hoped, will afford their countenance to these efforts, by their own attendance, and more particularly by inducing the young men growing up under their eye in their offices to avail themselves of the opportunity.

## HOME CORRESPONDENCE.

### PATENTS.

LETTER IV.

Sir,—In my three previous letters I have been considering the principal, I believe I may say the only, arguments which are commonly relied on by the defenders of the patent laws. I shall now go on to state some of the objections to patents, though I have been obliged incidentally to mention most of them already, particularly that which is the most important of all, namely, that the monopoly granted to a patentee prevents everybody else from using the invention, though he may have invented it independently, and even previously, or may have found out uses for it far more extensive and valuable to the world than the patentee ever contemplated; and consequently that patents impede instead of advancing the progress of invention and science.

The instance which I mentioned in my first letter, because it was thrown in my way, of Watt's invention of the sun-and-planet-wheel motion as a substitute for the crank will do as well as any other of the multitude which might be chosen for an illustration of the effects of a patent on other inventors of the same or better things. As I said before, Watt was precluded from using the crank, which he had himself invented, in his steam-engines, because the monopoly of it had just before been snapped up by another inventor, who thereby got the means of requiring exorbitant terms for the use of it, proportioned not to the value which he himself had given it, but to the value which Watt had given it by his other inventions. The same as if a man had got a patent for the invention of paper just before printing was invented; and then, the moment printing came out, the value of the paper patent would have been increased beyond all calculation, without any merit whatever of his, and the value of printing so much lessened to the public, who would have to pay the increased cost of books in consequence of the paper patent, and all because the invention had not been made a few years earlier, in which case the patent would have run out, and paper would have been free to print upon. And this hypothetical case would be still stronger, and still more like the actual case of Watt's invention, if the inventor of printing had also himself invented paper independently of the man who had just before got a patent for it. But it is worth while to look into this affair of the crank and planet-wheels a little more in detail.

Everybody who is likely to read these letters knows what a crank is, and that the object of it is to convert the vibratory or reciprocating motion of a steam-engine into rotatory motion of the main axle of the machine which the steam-engine has to drive. But probably everybody does not know what the sun-and-planet wheels were, as they have long been obsolete, and I suppose have never been constructed since the expiration of the crank patent left mankind at liberty to convert reciprocating into rotatory motion in the most direct and simple way. Suppose a toothed wheel of any convenient size fixed on the main axis of the machine to be driven, and another wheel, also of any size, set fast on the connecting-rod of the steam-engine, so as to work into the other wheel. The fixed axis of the connecting rod wheel must be tied to the main axis by some kind of link or strap (which, in fact, will look just like a crank), so as to keep the teeth of the two wheels always engaged. Then as the connecting-rod with its fixed (planet) wheel moves up and down, it will evidently make the other (sun) wheel and the axis of the machine revolve as a crank does, only not with the same velocity; for it may be easily shown that if the two wheels are of the same size, the sun wheel will turn twice round for one oscillation of the rod; and if the planet-wheel is smaller than the sun, it will turn less than twice for one oscillation. For example, if the sun has ten times as many teeth as the planet, it will make eleven turns for one oscillation of the rod; and if the planet-wheel is reduced to a single tooth or pin, then the motion becomes exactly the same as that of a crank.

Now the following remarks may be made on this contrivance:

1. Comparing it with the simplicity of Watt's other invention—the crank—everybody must see that it is utterly clumsy and abominable.

2. Although professing to be different from the action of the crank, and being so to a sufficient extent to evade the patent, it may yet be made to approach infinitely near to it, by increasing the number of teeth of the sun-wheel in proportion to those of the planet.

3. We may be sure that Watt knew all this just as well as we do, when he patented it as a distinct method of getting rotatory motion; and that he would never have used it as a substitute for the crank if he had been at liberty to use which he liked.

4. Whatever time he spent upon inventing it was wasted; that is, it might have been spent more profitably in doing something else which would have been of use to the world; whereas this thing has been of none, except that of protecting them from the extortion of the crank-patentee while his patent lasted.

5. However much we may admire his ingenuity in making this "beautiful contrivance," as one of his biographers rather absurdly calls it, and however much we rejoiced (as probably everybody did when he first read the account of it) at his thus defeating his antagonist, we must see that it would be more properly designated a "beautiful dodge" for evading the operation of an unjust and mischievous law, which would otherwise have obstructed the fair use of his own most valuable inventions for the benefit of a man to whom he was indebted for nothing.

6. It might have happened that no such evasion of the crank was possible, or that he had not the luck to find it out in time, or that the man of cranks had monopolised every one of the avenues (and there are very few) leading from vibratory to rotatory motion; and then Watt and the public would have been at his mercy, and he would have made an enormous fortune out of another man's inventions, and at the expense of either Watt or the public, or both.

7. Seeing that Watt himself was quite capable of inventing, and did invent, the crank without this man's assistance, the patent granted to him was an unmitigated evil and nuisance to society, and only escaped being a much greater nuisance, and an instrument of gross injustice, because a trick was discovered for evading it.

If anybody is inclined to say that this is an isolated, or even an extraordinary case, instead of mentioning others, to every one of which the same answer would be given, I will refer him at once to something which he cannot gainsay quite so easily, viz., to that Report of the Jury on Philosophical Instruments in the Great Exhibition, which I alluded to before. And considering the nature of the articles in that class (X.), and that it was very nearly, if not quite, the largest in the Exhibition—that the Jury comprised some of the most eminent scientific men of all nations of the world, and I may add, the remarkable elaborateness of their report, relating the numerous experiments they made, and showing the care with which they examined everything submitted to them—I think no one will venture to say that their opinion on the subject of patents is not entitled to unusual weight; and certainly not the less so, because their chairman had previously appeared as an advocate of the cheapest possible patents. I am sorry that I have not now the means of quoting their exact words,* but I know their Report says that they had been much impressed with the number of inventions which evidently had no other object or use than to evade existing patents; and that they could not avoid coming to the conclusion that *patents are an obstruction to the progress of science.*

There is, however, another special instance which one can hardly help referring to, considering the importance which has lately been attached, and the encouragement which has been given by this Society, to the progress of the Photographic art—perhaps the greatest wonder of this age. None of your readers can have forgotten that, although (by some lucky accident) the original Daguerreotype process for producing sun-pictures on metal failed to be secured by patent, Mr. Fox Talbot's process for taking pictures on paper was patented; and that such was found to be the effect of the patent in impeding the progress of the art in this country, that he was memorialised by some of the leading men of science to give it up to the public: which he did, without any compensation, except the satisfaction of knowing that he was thereby contributing to the advance, instead of interposing an obstruction, of an important branch of science.

And this instance also affords a sufficient refutation of what is likely enough to be alleged by the patent advocates, viz., that the imposition of a small royalty, which would probably be an inconsiderable addition to the price, cannot seriously interfere with the use of any invention of real value. We are now able to reply that, like a great many other alleged impossibilities, this interference is a fact. If it were not, the unusual, and I should think, unprecedented step of asking a patentee to give up his rights without a farthing of compensation, would never have been taken, or responded to. If it were not a fact that people find it worth their while to take a great deal of trouble, and often to resort to worse expedients, for the purpose of evading a patent, we should not have had the philosophical jury expressing their astonishment at the number of ingenious devices which they found had been resorted to with the single object of getting rid of the arbitrary interference of a patentee, in whatever way it may be exercised.

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* "We cannot help recording how clearly the injurious effects of patent enrolments on science were shown in the course of our labours; many of the ingenious contrivances exhibited proved to be merely variations, for the avoidance of the infringement of patents. In many cases the subjects patented were of a very trifling nature, but still their effect was to shut up the path in that direction from further improvement. The great advance of photography, previously alluded to, and the perfection of the microscope, are chiefly due to the avoidance of patents in connection with their improvements." —*Jury Reports, p. 246; Mr. Glaisher's Report, Class X.*

I said the *arbitrary* interference of the patentee; for although in most cases he may find it his interest to take either a moderate royalty, or (if he is the manufacturer himself) a moderate excess of price beyond the usual profit, it must be remembered that he is not the least obliged to do so. And it is easy to conceive a case where it would be his interest, not merely to demand a very large royalty, such as the crank patentee might have demanded, but to refuse to let the thing be used at all. A man of large capital buys a patent of an inventor, by which he is able to manufacture and sell at a good profit some article of common use, say at half the usual price. What is to prevent him from refusing to let anybody else use the invention at any practicable price, and so engrossing to himself the whole trade in the article, and ruining everybody else who makes it? It is no answer to say that though the other manufacturers are ruined, the public are benefited by their reduction of the price; for the public would clearly be quite as well, and better off, if all the other manufacturers could use the new invention as well as the patentee. It is the invention, and not the patent, which benefits the public; and it is the patent, and not the invention, which enables the one man who has bought it up to ruin his competitors and raise the price higher than he could if there were no patents and no monopoly.

But this same arbitrary power of a patentee over the invention he has bought up enables him, if he pleases, to do a still worse thing, and that is to suppress the invention altogether; neither letting anybody else use it at any price, nor using it himself. I confess that I should not have ventured to suggest this as a creditable mode of using a patent, if instances of it had not been published as matters of fact, both by some of the witnesses before the Patent Committee in 1851, and in several of the Exhibition Jury Reports. One of the most flagrant of them that I remember was the buying up, by some type-founders, of a machine for making types cheaper, and the patent for it, and actually destroying the machine; I suppose for fear it should be seen, and suggest to anybody something else on the same principle, but just wide enough to clear the patent. Incredible as this kind of proceeding may appear to many persons, I am sorry to say I have no difficulty in believing it myself; nor will anybody who has had opportunities of observing the mere shopkeeping spirit of many of the people engaged even in what may be called scientific trades, and of their determined hatred of everything in the form of an invention which would involve them in any immediate expense, or disturb their everyday mode of doing business, or (as they think) make their goods too cheap. And yet I believe these people can generally read and write, which their predecessors and prototypes, who went about burning power-looms and threshing machines, could not. I doubt whether there is any trade to which these remarks can be more applicable than one which may be considered a peculiarly scientific trade, viz., clock-making. If it were not so, we should long ago have had clocks made here by machinery; and better, if not cheaper, than the American and French clocks, which are so made, instead of hearing the clockmakers perpetually complaining of the perverseness of the public in refusing to buy English clocks (many of which are no better), at six times the price of the American's. The late Mr. Dent used to say, that if he was ten years younger he would have done it himself; as indeed he had begun to do with turret-clocks, making better ones of cast iron than had ever before been made of brass.

And this practice of buying up patents to prevent competition, or interference with the established mode of doing business, is rather likely to increase than to diminish, as patents, like everything else, are getting more into the hands of joint-stock companies. Indeed so suspicious has the law apparently been of the danger of letting them get into such hands, that it requires an Act of Parliament to enable a company to hold a patent.[*] We know pretty well what railway companies will do to get rid of a competition; and patent companies are not likely to be more scrupulous. And when we find the chairman of the Electric Telegraph Company confessing—and that was two years ago—that they had bought up 132,000*l*., worth of patents (if I remember right), some of which they had never used nor intended to use, it is not difficult to guess what a company possessed of a large and expensive stock of instruments or machinery would do with a patent which they thought likely to give them any trouble, if they could get hold of it. I need hardly add, that an invention suppressed by a patent is a great deal worse than an invention not yet made. For where it is not yet made, it may be made any day; but where it is made, patented, and suppressed, the man or the company who have bought it up are more certain than any other patentee to take very good care that nobody else uses it for fourteen years. This then is another way in which patents may be, and sometimes are, an unqualified evil to society, and a direct obstruction to the progress of the arts and sciences.

The stoppage of everybody who is travelling the road on which a patentee has been allowed to erect his toll-bar, either until he has paid the toll demanded, or for fourteen years absolutely, if it suits the patentee to shut up the road altogether, is also very much aggravated by the notorious fact, that inventions are generally made just when the world is ripe for them; that is to say, when science has arrived at the point at which such inventions are sure to spring up, and when several persons are at once on the point of discovering them. Hence the innumerable and proverbial contests about priority of invention, even when there is no patent to fight for. There were no less than four claimants for the application of the pendulum to clocks about 230 years ago, when inventors were not so numerous as they are now. Never, hardly, does a notice of anything appear in a newspaper as the invention of anybody, but you see, in a day or two, an indignant letter claiming it for somebody else, generally the writer; with a series of flat contradictions, and perhaps a few more claimants, which might go on *ad infinitum*, but for the opportune notice, after a few shots have been fired, that "all future communications must be treated as advertisements." The notion, therefore, of a patent monopoly being a fair, or proper, or necessary reward, or encouragement to the man who is far in advance of his age,—and not only invents for them what they are requiring, but shows them what they ought to require,—is founded on what is, in nine cases out of ten, a pure fiction. The man who gets the patent is, more likely than not, one of a considerable number, all on the same scent, and all of them very likely put on it by somebody else; and the one who, by greater luck, or boldness, or, if you like, cleverness, gets his scheme into shape for the Patent Office a little sooner than the rest. Quickness of action in this, as in most other things, no doubt ought to have its reward, and in one way or other is pretty sure to get it; but it by no means follows that it is necessary or expedient to distribute the rewards of science on the pinciples of the race-course or the lottery-wheel.

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[*] This is not so now, though it was formerly. There used to be a condition, making the patent void if it became the property of more than five persons, afterwards relaxed to twelve. By the existing law, there is no restriction whatever as to number of owners.—*Ed. Soc. Arts' Journal.*

I will end this letter with one more instance, to show how inadequate the patent system is to do justice, and to avoid injustice and absurdity. The readers of this Journal were edified a few months ago with a discussion about what is called the secondary compensation for chronometer balances. Well, there were no less than seven, and, I believe, more inventions made for that purpose within less than that number of years, and disclosed more or less publicly, and some of them patented and others not. Two of them were exactly the same, and the one of those two which was patented was so after the other had been, not indeed published, but shown to the Astronomer Royal. All of them are substantially on the same principle, and any one of them might very well have been suggested by any of the others, although, perhaps, some of them may be distinct enough for their patents to stand a trial. But although they are all on the same principle, I have reason to believe that they were nearly all *bonâ fide* independent inventions; and they very easily might be so, because the principle of the invention is perfectly obvious, and would occur to almost any clever man in the business, as soon as anybody had discovered and pointed out what the chronometers really wanted; and that discovery (like so many others) is just the thing which was not a matter of mechanical invention, but of scientific deduction from published documents, viz., the lists of the Greenwich trials, and therefore could not be patented. Instead of fighting about the patent rights, the chronometer-makers have all gone on using their own, each asserting that his own is the best; and, in fact, there is so little difference in their success, that this would be an additional source of injustice if any one of them had been able to interfere with the others.

Leaving your readers to make their own reflections on the various points suggested by this case, which I do not suppose is a singular one, I hope to conclude what I have to say against patents in one more letter, and remain, yours faithfully,

E. B. DENISON,

Ben-Rhydding, Leeds,
5th September.

## PATENTS.

SIR,—Notwithstanding Mr. Denison's long and ingenious arguments against patents, I submit that he has left the very gist of the question untouched. Invention proceeds from knowledge and labour, requiring much in some cases, and little in others; but in all cases a certain amount. It is the policy of all civilised states to recognise the result of a man's labour as his property. Why is inventive labour to be an exception? unless it can be proved that invention is hurtful to mankind, which I feel sure Mr. Denison will not maintain. The inventor ought to be protected from robbery just as much as any other man is protected by civilised communities in the fruits of his labour. For special and good reasons he obtains only a limited protection; but all jurists of any eminence, who have thought or written on the subject say, that it is right policy to allow this limited protection. Jeremy Bentham, John Stuart Mill, and M'Culloch are not likely to be the advocates of rights injurious to communities. Allow me to ask Mr. Denison to discuss the following opinions of theirs, and to prove the fallacy of them:

Jeremy Bentham says:

"There is one species of privilege certainly very advantageous: the patents which are granted in England for a limited time, for inventions in arts and manufactures. Of all the methods of exciting and rewarding industry, this is the least burthensome, and the most exactly proportioned to the merit of the invention. This privilege has nothing in common with monopolies, which are so justly decried. . . . . With respect to a great number of inventions in the arts, an exclusive privilege is absolutely necessary, in order that what is sown may be reaped. In new inventions, protection against imitators is not less necessary than in established manufactures protection against thieves. He who has no hope that he shall reap will not take the trouble to sow. But that which one man has invented all the world can imitate. Without the assistance of the laws, the inventor would almost always be driven out of market by his rival, who finding himself, without any expense, in possession of a discovery which has cost the inventor much time and expense, would be able to deprive him of all his deserved advantages, by selling at a lower price. An exclusive privilege is of all rewards the best proportioned, the most natural, and the least burthensome. It produces an infinite effect, and costs nothing. 'Grant me fifteen years,' says the inventor, 'that I may reap the fruit of my labours: after this term it shall be enjoyed by all the world.' Does the sovereign say, 'No, you shall not have it,' what will happen? It will be enjoyed by no one, neither for fifteen years nor afterwards; everybody will be disappointed—inventors, workmen, consumers; everything will be stifled, both benefit and enjoyment."

John Stuart Mill, in his "Principles of Political Economy," is very explicit:

"The condemnation of MONOPOLIES ought not to extend to patents, by which the originator of an improved process is permitted to enjoy, for a limited period, the exclusive privilege of using his own improvement. This is not making the commodity dear for his benefit, but merely postponing a part of the increased cheapness which the public owe to the inventor, in order to compensate and reward him for the service. That he ought to be both compensated and rewarded for it will not be denied, and also that if all were at once allowed to avail themselves of his ingenuity, without having shared the labours or the expenses which he had to incur in bringing his idea into a practical shape, either such expenses and labours would be undergone by nobody except very opulent and very public-spirited persons, or the state must put a value on the service rendered by an inventor, and make him a pecuniary grant. This has been done in some instances, and may be done without inconvenience in cases of very conspicuous public benefit; but in general an exclusive privilege of temporary duration is preferable, because it leaves nothing to any one's discretion; because the reward conferred by it depends upon the inventions being found useful, and the greater the usefulness the greater the reward: and because it is paid by the very persons to whom the service is rendered—the consumers of the commodity. So decisive, indeed, are these considerations, that if the system of patents were abandoned for that of rewards by the state, the best shape which these could assume would be that of a small temporary tax, imposed for the inventor's benefit, on all persons making use of the inventions. No limit can be set to the importance even in a purely productive and material point of view of mere thought. . . . Intellectual speculation must be looked upon as a most influential part of the productive labour of society."

Mr. M'Culloch says;

"The expediency of granting patents has been disputed, though, as it would seem, without any sufficient reason. Were they refused, the inducement to make discoveries would in many cases be very much weakened; at the same time that it would plainly be for the interest of every one who made a discovery to endeavour, if possible, to conceal it. And notwithstanding the difficulties in the way of concealment, they are not insuperable; and it is believed that several important inventions have been lost from the secret dying with their authors."—*Commercial Dictionary*.

I hope Mr. Denison will give the members of the Society an opportunity of having a full discussion on the policy of granting patents in the next Session, and then we will try and show that what is the practice of almost every modern civilised community, and the theory of the most distinguished jurists, is right.

Your obedient Servant,

HENRY COLE.

## OCEAN NAVIGATION.

SIR,—In perusing the number of your Journal for August 19th, I was struck with the opinions arrived at by our American friends of our great Exhibition, and of their share in it; and although I think that there can be no one, of any nation, who knows anything of the matter, who could be misled by the concluding sentences of your extracts, yet the same remark may not hold good as to two articles which, singularly enough, appear in juxtaposition in your last number—those upon "Ship Building," and "Improved Ocean Navigation"—as it is my opinion that the second is more dependent on the first than upon itself for the progress we have lately witnessed in maritime affairs.

Having carefully examined the "Improved Sailing Directions," issued from the Hydrographic Bureau of the United States, I think that the proposition stated in that work cannot be well sustained—that it "contains the notice of sixteen actual discoveries, and twelve probable discoveries in hydrographical science." I repeat, that others have suggested or demonstrated, in many or most instances, what is there confirmed or amplified: nor do I think that the absolute benefits to navigation have as yet been very evident from their application. Indeed, it is stated in the work itself that the proposed new routes between Europe and North America have not been attended with the anticipated success; but this might have been predicted, as the region is so well traversed, and its nature so well ascertained. The route advocated from New York to Cape San Roque might have been recommended from pre-existing data, and therefore the advantage gained of reducing the passage to the equator from an average of forty-one days to twenty-four days, ought not to be entirely attributed to that source. Perhaps the circuitous route formerly followed, leading three times across the ocean, might have been derived from the Americans following European sailing directions, as those hitherto in use among the American marine are almost exclusive (but unacknowledged) transcripts of English works.

But while I would accord every meed of praise to the great energy and talent of the worthy American officer who originated this investigation of maritime phenomena, I have that "jealousy of good works" which would claim for others, and for our own nation, that merit to which it is entitled. It must be observed that the American observations are mainly confined to the Atlantic; but the conclusions arrived at are the same as those propounded by Dr. Young, Halley, Basil Hall, and others, as respects atmospheric circulation, but certainly they are more exactly stated. And on the subject of currents, the laborious and important "Investigation of the currents of the Atlantic," the result of the personal and unassisted labour of Major Rennell, still contains nearly all that we know of the matter. Other names might be included in this claim; one other, well known to the Society of Arts, deserves signal attention—that of Sir William Reid, the author of the "Law of Storms," to whom, although he did not stand alone in this good work, (Mr. W. C. Redfield, of New York, and others, joining with him,) a debt of gratitude of no ordinary kind is due, and also to the last-named gentleman. These are topics included among many others, which, without consideration, might be supposed to have originated entirely with the present American inquiry; but the United States were not the first to enter on this field of research: our knowledge of the winds and currents of the Atlantic were placed nearly on their present basis by the previous labours of Rennell and others.

The real harvest is to come. The Indian Ocean, and especially the Oriental Archipelago, is an untried field, although growing into daily and vast importance. The phenomena of the Pacific, too, is almost unknown; and it is to be hoped that mariners of every nation will cordially co-operate with each other in collecting and disseminating useful knowledge, and I doubt not but that we shall not be last in this honourable rivalry.

But the arrangement of this is the work of the Government, not of the individual; and I sincerely trust that our Admiralty may establish such an office, or branch of their own department, as may shortly supply the requirements of the day, as there must be abundant information, almost sufficing to draw up a perfect system, now buried in its archives.

Now, with respect to the other topic—that of ship-building. If ships—as the *Sovereign of the Seas*, or the *Flying Cloud* have done—can make good 433 and 419 statute miles per day, or 5,391 nautical miles in 22 days, they are sure to make extraordinary passages, totally irrespective of any improved sailing directions; and here we have the true secret of the improvement: and I think with your correspondent, "A Member," that it is an excellent field for the Society to enter upon—to gather together facts and data whereon to found opinions as to the best form and capabilities of ships.

I would also remark, that some of the finest of these clipper ships are not American, but English colonial ships, constructed by British skill; and that we may look forward to a new era in the ship-building of our own country, as there is in that of the United States.

I am, Sir, yours obediently,

ÆOLUS.

## SHIP-BUILDING.

SIR,—The intentions of the writer, in his letter on this subject, inserted in your Journal (No. 40), are excellent; but unfortunately his suggestion of offering a premium, or reward, for improvements in this art cannot be carried out with any hope of success. Even a premium of a few thousands would be nothing when compared with the vast capitals employed in ship-building; and besides, no gentlemen in a large way of business would ever think of entering into a competition suitable only to young beginners.

The art of ship-building requires no treatises or other fostering care to bring it forward; it is no weak or sickly child; all it requires is to be let alone. That, however, is not the case at present; and no material improvement can take place in the hulls of our merchantmen so long as the legal measurement of tonnage remains as it is.

Under the present tonnage laws, all the practical knowledge, skill, and ingenuity of our shipwrights is absorbed in the endeavour to produce a shapely hull, which shall be *flattened in* wherever the surveyor's measurement is taken, and *swelled out* wherever it is not. The system carries absurdity on the face of it, and cannot even pretend to the slightest approach to accuracy; for a vessel could be built so as to carry either double or only one half of her legal tonnage, and yet her legal tonnage is given to the one-hundredth part of a ton, or less than a quarter of a cwt. A racing yacht will even carry nothing; because if relieved of part of her ballast, and her ample saloons were filled with merchandise, her sailing trim would be bottom-upwards.

All obstacles to improvement in naval architecture will vanish whenever the register tonnage shall be the weight of sea-water displaced by sinking the vessel from light to load water lines, which are fixed and determined by the shipwright when the draft is made, and he might be required to give an attested document on delivering the ship, to be added to, or inserted in the ship's papers, showing her true displacement in tons and hundredths of a ton.

Yacht-building is called the nursery of naval architecture, but it is not so, at least to any appreciable extent, because no one rule followed by the racing yacht builder would be of any avail in the construction of vessels intended for ordinary purposes. Moreover, besides the adoption of the old tonnage laws, the racing clubs have established such rules and regulations as are calculated to give the slowest as well as the fastest sailer an almost equal chance of winning the cup, and they do not exclude any amount of jockey ship compatible with club honour; so that if the experiment were tried of changing the crews of two yachts, the loser would become the winner, and *vice versâ*.

If racing yacht clubs have any intention of testing the true sailing powers of their vessels, they should distinguish the classes by one single linear measurement only, say length of keel or length over all, and leave out of the question all matters relating either to tonnage or rig. Then indeed yacht-building would be truly the nursery of naval architecture. One of the swift *Tartunas* or *Schiabeccos* of the Mediterranean would beat the fastest English yacht, but she could not run a match, because she would be out of all rule and order with the yacht clubs. I remain, Sir,

Your obedient Servant,
Poole, Sept. 2nd, 1853. HENRY W. REVELEY.

## LECTURE LIST.

Poole, August 31st, 1853.

SIR,—In your Journal of the 26th instant, a contributor, under the signature of a "Labouring Man," offers his testimony to the valuable assistance afforded to Institutions by the publication of your Lecture List, regretting at the same time that so small a number of Institutions had filled up and returned your schedules, thereby rendering the list less comprehensive and effectual than it otherwise might have been. Now, Sir, both in his admission of utility and regret for its restricted character, I perfectly coincide with the writer; but, unfortunately, I am in a position to do more than this; I can not only regret that so small a number of Institutions should have availed themselves of the proffered advantages, but I can suggest to your correspondent *the reason* which has conduced, and will still continue to conduce, to this apparent blindness, unless members of Institutions will individually become more active in the services of the society to which they belong, than has been hitherto found to be the case. To the members of an Institution, the Union with the Society of Arts, or with any other Society, may appear a very easy and simple matter; but let them apply to their Secretary, and they will find that to him it is attended with a great increase of his already tolerably voluminous correspondence, almost sufficient of itself to constitute an occupation. Members individually, or Institutions as a body, are ready enough to avail themselves of any advantage of this kind; but before it will be *possible* for them to do so to any extent, they must find some machinery capable of conducting the correspondence, without throwing the whole onus on an Honorary Secretary, who having, in most cases, business of his own to attend, cannot (however he may wish so to do) devote sufficient time and attention to the object.

In conclusion, I beg to express the gratification I felt on perusing the "List of Lecturers and their Subjects," the publication of which cannot fail to be productive, and to materially assist the Committees of Institutions in their selection of Lecturers.

I am, Sir, yours faithfully,
J. B. BLOOMFIELD, Hon. Secretary.
Town and County Library and Literary Institute.

## PROCEEDINGS OF INSTITUTIONS.

NORTHERN UNION.—The Annual Meeting of the Northern Union of Mechanics' Institutions was held on the 24th ultimo, at Hexham, on which occasion delegates attended from Newcastle, South Shields, Hexham, Blaydon, Corbridge, &c. In the absence (owing to illness) of W. B. Beaumont, Esq., M.P., the chair was taken by Philip Henry Howard, Esq. The Secretary read a Report, from which it appeared that the number of Institutions included in the Union amounted to twenty-eight, and numbered 2,192 members; and possessed libraries to the extent of 23,498 volumes. The gross income of the Institutions in Union amounted to 846*l*. The Report referred to the proposed free distribution of Parliamentary papers, to the advertisement and paper duties, also to the usefulness of the itinerating library connected with the Union, and recommended the formation of sub-Unions and local museums. The efforts of the Society of Arts to extend the usefulness of Mechanics' Institutions were referred to, and the Report concluded with a strong expression on the part of the Committee of the eminent services rendered by Mr. Grant, the lecturer to the Union. The Report having been adopted, Mr. Matthew Hutchinson, on behalf of the Mechanics' Institution, South Shields, invited the Union to meet in that town in 1834. The officers for the next year were then elected, and the usual votes to the retiring officers passed, after which the members dined together, when the Chair was taken by Mr. Howard, and the Vice-Chair by Mr. Sopwith.

WANDSWORTH LITERARY AND SCIENTIFIC INSTITUTION.—This Institution has started a Monthly Journal, and has just issued its first Number. Its object is stated to afford a more ready communication with the members, increasing from year to year, and many of whom are unable to attend the lectures, &c. The Journal is intended to contain a brief review of the proceedings of the Institution occurring the previous month, as well as a notice of those to come. "As in every community," says the opening article of the Journal, "it is most important that all demands and offers of supply should be readily made public, and that the wants of all classes should be most speedily made known to each other, we purpose to unite with our Journal an advertising sheet, which, in the opinion of many individuals who have been long resident in the place, is much wanted. We have indeed to thank the legislature for those recent acts, which will enable us to undertake the insertion of advertisements at a very low rate; and, we trust, lessen to a considerable extent the expenses of the Journal. As this work will emanate from a committee the majority of whom are *working men*, we hope our readers will not pass a too severe criticism upon our endeavours: our earnest wish being to fulfil (as far as our capacities will permit us), the duties of a committee of an Educational Institution."

## MISCELLANEA:

**Lightning Conductors.**—The Government have granted Sir William Snow Harris a sum of 5,000*l.*, for perfecting a mode of applying lightning conductors on board ships.

**The Soap Plant.**—The Vienna journals announce that a firm of California has sent home to that city some seeds of the soap plant. It grows wild in California, rising to the height of about a foot. The plant fades away in the month of May, and inside each is a ball of natural soap, superior, it is assured, to any that can be manufactured.

**Machine for Boring Rocks.**—Mr. E. Talbot has patented a method of boring rocks, consisting of an apparatus, in which a series of cutters, or chisels, are caused to cut out segments of circles from the centre to the periphery of the opening to be excavated, and by a continuous succession of instruments the whole of the rock is cut away.

**Artificial Stone.**—Messrs. Julius Horing and Ludwig Suess, of New Jersey, have patented a process for the formation of artificial stone, in which they employ a compound of silex, alumina, and chloride of sodium. The mixture not only can be manufactured into blocks of artificial stone, but can be applied as a glaze to pottery wares.

**Improved Penholder.**—Mr. James Goodfellow has invented a new penholder, in which the pen is held by a small cylinder, which moves easily in a tube, the cylinder being kept in its position by a light coiled spring within the tube. This spring gives the pen a great deal of flexibility, and prevents the point from entering the paper when writing with rapidity.—*Journ. Roy. Corn. Poly. Society.*

**Crayon for Writing on Glass.**—M. Brunquell prepares a crayon for writing on glass so as to enable the contents of glass vessels to be inscribed on them at once. He takes four parts of spermaceti (stearine), three parts of tallow, and two parts of wax, and melts them in a cup; six parts of minium and one part of potash are then stirred into it, and the whole is kept warm for half an hour, and then poured into glass tubes of the thickness of a lead pencil. After quickly cooling, the mass may be screwed up and down in the tube, and cut to a fine point with a knife. This crayon will readily write on clean, dry glass.—*Dingler's Polytechnic Journal.*

**Cotton Ropes for Ships, and Cotton Nets.**—There is a novelty about the *Sovereign of the Seas* that doubtless will be soon imitated by other vessels. The ropes which form the running rigging are of cotton, which we understand is not only capable of a lighter twist, but is not liable to become deteriorated by friction in the same degree as hempen cords. After they have been in use too for years, they can be sold for nearly as much as the original cost. These ropes are quite smooth, and run with great rapidity through the blocks. The sails also of this vessel are of cotton, two sets of cotton sails costing only the sum paid for one set of linen. Fishing nets made of cotton are much used in America.

**Gasometers.**—Some few years ago, several of the most "eminent engineers" of the day gave evidence before a Parliamentary Committee to the effect that a gasometer of greater diameter than 35 feet would be dangerous, and recommended that in all cases where this limit was approached, a series of strong walls should be built round the gas-holder in order to lessen the injury which the almost "inevitable" explosion might entail. One has lately been manufactured at Smethwick of 165 feet diameter. The gas-holder of the Philadelphia Gas-works, erected in 1850, is 140 feet diameter, and 74 feet high, and one now erecting there will be 160 feet diameter and 90 feet high, with a top nearly flat, having only rise enough to carry off the water, without the usual framing and rafters for sustaining the crown. —*Jour. Franklin Inst.*

**Books to Prince Edward Island.**—"The Lords of Her Majesty's Treasury having authorised, by warrant, the extension to Prince Edward Island, of the reduced rates of postage, and the regulations recently established for books transmitted by the post to the British Colonies in the West Indies, &c., all printed books, magazines, reviews, and pamphlets (whether British, Colonial, or Foreign), may be sent, on and from the 1st September, by the post between the United Kingdom and Prince Edward Island, at the usual reduced rates of postage. This does not extend to or interfere with the transmission of printed votes and proceedings of Parliament, or of printed papers allowed to pass by the post under the newspaper privilege, all of which will continue subject to the existing regulations.

**African Produce.**—A sale lately took place, in Manchester, of various articles recently imported from Africa. There were twenty bags of cotton, of native growth, and 124 boxes of arrowroot, weighing about fifty pounds each box. Very different opinions have been expressed respecting the quality of the arrowroot by competent judges of other descriptions; but it is understood, from those who have made special trial of it, that its quality is very good, and that a connoisseur could scarcely distinguish it, in taste, from Bermuda arrowroot, which is admitted to be the best. All the 124 boxes found buyers, passing into thirteen or fourteen hands, at 7*d.* per lb., which is a price only reached by superior descriptions. Several parcels of Cayenne pepper passed into four hands, at 1*s.* per lb., which is considered to be somewhat under its value. Of the twenty bags of cotton offered, five were respectively of different colour and quality, and each bag was therefore submitted as a separate lot. The lowest quality fetched 4*d.* per lb., the second sold for 5¾*d.*, for the third 6¾*d.* was obtained, and for the best 7*d.* was given. The remaining fifteen bags went off at 6¼*d.* per lb. The cotton is considered to have fetched a fair price, and such as will encourage the natives in its more extensive cultivation.

**The New Law on the Smoke Nuisance in the Metropolis.**—The new Act to abate the smoke nuisance in the Metropolis has just been printed. There are eight sections in the new law, and it enacts that from and after the 1st of August next furnaces in the Metropolis shall consume their own smoke, under penalties laid down. The Act extends to any mill, factory, printing-house, dye-house, iron-foundry, glass-house, distillery, brewhouse, sugar refinery, bakehouse, gasworks, waterworks, or other buildings used for the purpose of trade or manufactures, within the Metropolis. From the same day steam-vessels on the Thames above London-bridge are to consume their own smoke, under penalties to be recovered in a summary manner before a magistrate. The words, "consume or burn the smoke," are not to be held in all cases to mean, "to consume or burn *all* the smoke;" and the justices before whom any persons shall be summoned may remit the penalties if they are of opinion that such person has so constructed or altered his furnace as to consume or burn, as far as possible, all the smoke arising from it, and has carefully attended to the same. Constables may be empowered to enter and inspect furnaces and steam-engines. No information is to be laid under this Act to recover any penalty, except by the authority of the Secretary of State, or the Commissioners of the Metropolitan or City of London police.

## TO CORRESPONDENTS.

*Notice.*—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the Journal regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 2nd September*, 1853.

*Dated* 1*st August*, 1853.

1788. J. Smeeton, Limehouse, Middlesex—Tablets and dial-plates, showing distances, and for barometers, &c.

*Dated 2nd August.*

1804. W. H. Clarke, 20, Great Marlborough-street—Composition resembling papier maché, &c. (A communication.)

*Dated 6th August.*

1842. H. Southam, Gloucester—Ploughs.

*Dated* 16*th August.*

1912. J. Stewart, St. Paul's-road, Camden-square—Pianofortes.
1914. E. Finch, Bridge Works, Chepstow, and C. Lamport, Workington—Ships' masts and rigging.
1916. J. Atherton, Preston, and J. Abbott, Accrington—Winding-machines.
1918. G. Richardson, Eastern Counties' Railway, Shoreditch—Railway signals.
1920. A. V. Newton, 66, Chancery-lane—Distillation of resin-oil. (A communication.)

*Dated* 17*th August.*

1921. J. Heritage, Warwick—Bricks, tiles, &c.
1922. S. Perkes, 1, Walbrook—Construction of cocks, &c. (A communication.)
1924. T. C. Ogden and Wm. Gibson, Manchester—Machinery for preparing, &c., flax, &c.
1925. T. Kirkwood, Edinburgh—Ventilation.
1927. G. L. Fuller, 13, St. Mary's-road, Peckham — Steam-engines.
1928. J. H. Mortimer, 1, Chester-place, Old Kent-road—Lamps.

*Dated* 18*th August.*

1929. R. Clough, Liverpool—Construction of ships.
1930. D. Chalmers, Manchester—Cutting the pile of woven fabrics.
1931. D. Harkes, Mere, Cheshire—Mowing and reaping apparatus.
1932. A. Pigé, Greek-street, Soho—Locks and keys. (A communication.)
1933. W. Symes, Pimlico—Fruit-cleaning machine.
1934. J. Larmanjat, 16, Castle-street, Holborn—Motive-power.
1935. P. Fairbairn, Leeds—Heckling-machines.
1936. W. Curtain, Retreat-place, Homerton — Machinery for printing textile fabrics, &c.
1937. W. Cornelius, Panton-street, Haymarket—Gilding porcelain, &c. (A communication.)
1938. A. M. M. de Bergevin, Paris—Manufacture of coke. (A communication.)
1939. T. Hughes, Birmingham — Improvements in writing-slates, &c.

*Dated* 19*th August.*

1940. F. W. A. de Fabeck, 6, Portland-road—Construction of viaducts, &c.
1941. A. Lutwyche, Birmingham—Steel and metallic pens.
1942. C. Watt, Selwood-place, Old Brompton, and H. Burgess, 7, Percy-street, Bedford-square—Preparing vegetable substances.
1943. G. Heyes, Bolton—Looms.

*Dated* 20*th August.*

1944. J. Kimberley, Birmingham—Raising and lowering window-blinds, &c.
1946. J. B. Polaillon and F. Maillard, Lyons—Starch.
1947. R. M. Sievier, Louviers, France, and Manchester—Machinery for manufacture of terry, &c.

*Dated 22nd August.*

1951. S. Lomas, Manchester—A silk-cleaner.
1953. A. E. L. Bellford, 16, Castle-street, Holborn — Manufacture of mineral oils and paraffine. (A communication.)
1955. F. Osbourn, Albion-street, King's-cross—Machinery for cutting woven fabrics.

*Dated 23rd August.*

1957. W. Brown, Glasgow—Obtaining volatile products from bituminous substances.
1959. J. Webster, Leicester—Pressure guages.
1961. W. Rettie, Aberdeen—Submarine lamp.
1963. J. Whiteley, Stapleford, Notts—Warp machinery.
1965. W. M'Leish, Battersea—Machine for destroying weeds.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed* 1*st September*, 1853.

511. Edward Charlesworth, of York—Improvements in bill or letter-holders.
521. John Smith, of Upper Fountain-place, City-road, William Henry Smith, of the same place, and Alexander Williams, of Seething-lane—Improvements in metallic plates, and in producing devices or ornamental patterns thereon, and in the apparatus and machinery to be used for such purposes.
550. Henry M'Envoy, of Birmingham — Improvements in covered buttons.
554. Mary Ann Smith, of Wimpole-street—Improvements in the manufacture of toys, models, and other like articles of ornament or utility.
556. Baldwin Fulford Weatherdon, of Chancery-lane, and Charles Dealtry, of Guernsey—Improvements in the construction of certain floating vessels, and in the mode of propelling them.
557. Thomas Wells Cross, of Hunslet—Portable fire-engine.
558. William Todd, of Rochdale—Improvements in steam-engines.
560. Richard Archibald Brooman, of Fleet-street—Improvements in machinery for making pipes and tubes. (A communication.)
563. William Barrington, of Mallow—Improvement in life-boats.
567. Jacques François Dupont de Bussac, of King's-road, Chelsea—Improvements in paving and covering places. (A communication.)
571. Thomas Weatherburn Dodds, of Rotherham—Improvements in the treatment and manufacture of iron and steel.
572. Charles Parker, of Dundee—Improvements in weaving.
574. Thomas Weatherburn Dodds, of Rotherham—Improvements in the manufacture of wheels and axles.
577. John Hall and John Crofts, both of Birmingham—An improvement or improvements in revolving or repeating fire-arms.
603. Henry Ransford, of Chelsea—Improvements in the manufacture of starch.
577. James Summers, of West Cowes—Improvements in certain kinds of sails.
621. William Muir, of Manchester—Improvements in machinery or apparatus for grinding edge-tools and other articles.
634. William Edwards Staite, of Manchester—Improvements in apparatus for producing and applying current electricity, parts of which apparatus are applicable for obtaining and treating certain chemical products resulting from electrotype action.
641. William Bashall, jun., of Preston, Lancashire—Improvements in dressing, sizing, and tape-machines.
653. Henry Richardson Fanshawe, of Arthur-street, Old Kent-road—Improvements in fire-arms.
680. John Eldridge, of Stanley-street, Pimlico—Invention for washing woollen, linen, cotton, silken, hempen, skin, and flaxen materials and substances, and called the "Rotary Washing-machine."
696. John Stather, of Kingston-upon-Hull—Improvements in printing.
710. William Mann Crossland, of Beaumont-street—Improvements in block-making machinery.
819. Thomas Carr, of Chowbent—Improvements in nails and other fastenings, and in the machinery or apparatus employed in the manufacture thereof.
946. Thomas Day, of Birmingham — Improvement in the manufacture of boots and shoes, whereby great ease is secured to the wearer.
1139. Peter Wright, of Dudley—Improvements in the construction or manufacture of tew-irons.
1475. Christopher Wand, Edward Wand, and William Busfeild, all of Bradford, Yorkshire—Improvements in preparing wool and other fibrous substances.
1557. George French, of Bandon, Ireland—Improvements in axles or axletrees.
1625. Louis Cornides, of Trafalgar-square—Improvements in treating certain ores and minerals, for the purpose of obtaining products therefrom.
1638. Henry Hoskyn Peppin, of New Bond-street—Improved joint for umbrella and parasol-sticks. (A communication.)
1646. Peter Fairbairn, of Leeds — Improved machinery for heckling flax, hemp, China grass, and other fibrous materials.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Sept. 3 | 3506 | Dandy-roller, for the manufacture of paper. | T. H. and G. F. Busbridge | East Malling, Kent. |
| „ 6 | 3507 | An Economic Letter-balance | John Shelden | 55, Great Hampton-street, Birmingham. |

SOCIETY OF ARTS.

FRIDAY, SEPTEMBER 16th, 1853.

## THE NEW PATENT LAW AMENDMENT ACT.

An important Act of Parliament was passed last Session to amend, and to some extent supply, the deficiencies of the Act of last year. That Act, it is well known, though lingering through its early stages, was passed with some degree of haste at the close of the Session. To have attempted to make the Bill as perfect as its promoters could have wished, would at that time have endangered the passing of the Bill, and it was thought more prudent to let it remain as it was, and to trust to future legislation for its improvement. This is the object of the present Act.

Sect. 1 repeals the 33rd, and that part of the 28th section which directs that in case reference is made to drawings in any specification deposited or filed under the said Act, an extra copy of such drawings should be left with such specification.

By sect. 2, it is provided that "true copies of all provisional specifications left at the office of the Commissioners" shall "be open to the inspection of the public at such times, after the date of the record thereof respectively, as the Commissioners shall direct."

Hitherto, by the operation of the old law, the provisional specifications were not permitted to be inspected, and this clause gives authority to the Commissioners to exercise their discretion. Whether the provisional specification should be open for inspection at once, or kept secret till the complete specification is filed, is left to the Commissioners to determine. It would seem more in accordance with justice to others that the provisional specification should at once be made public, immediately on its being deposited at the offices. The applicant gets his protection; the public in return ought to know what it is for. Probably some intermediate course will be adopted, and the provisional specification be open for inspection at the end of three or four months.

By sect. 3, "a true copy, under the hand of the patentee, or applicant, or agent of the patentee or applicant, of every specification and of every complete specification, with the drawings accompanying the same, if any, shall be left at the office of the Commissioners on filing such specification or complete specification."

By sect. 4, it is provided that "printed or manuscript copies or extracts, certified and sealed with the seal of the commissioners, of letters patent, specifications, disclaimers, memoranda of alterations, and all other documents recorded and filed in the Commissioners' office, or in the office of the Court of Chancery, appointed for the filing of specifications, shall be received in evidence . . . without further proof or production of the originals."

This is a most important provision, and is intended to meet the objections to the clause in the Act of last year (Sect. 33 now repealed), which provided that copies by the Queen's printer should be evidence, however erroneous they might happen to be. It is obvious this clause will be of great convenience in the production of evidence at trials, and will tend much to reduce the expenses under this head.

By sect. 5, "certified printed copies, under the seal of the Commissioners, of all specifications and complete specifications, and fac-simile printed copies of the drawings accompanying the same, if any, disclaimers, and memoranda of alterations filed or hereafter to be filed under the said Patent Law Amendment Act, shall be transmitted to . . . . . Scotland and Ireland within twenty-one days after filing . . . . and shall be filed" there "respectively, and certified copies or extracts from such documents shall be furnished to all persons requiring the same on payment of such fees as the Commissioners shall direct; and such copies or extracts shall be received in evidence in Scotland and Ireland respectively."

This clause has for its object the simplifying the practice on the 29th Section of the Act of last year, and enables printed copies to be used; doubts having arisen whether printed copies were "true copies" under that Act.

It will be remembered that the Act of last year provided for the printing of specifications, &c., but omitted to limit any time; this section will now remedy this absurdity, and it is believed that the public will soon have the benefit of this most important part of the new patent law. It is understood that preparations are being made for supplying at a cheap rate not merely the printed copies of the current specifications, but those of past years. Series, too, will be got together, so that any one wishing to learn what has been patented in any one particular direction, may purchase that group in a printed form. Such, for instance, as a person requiring to know what has been done in reaping machines, may purchase that group of specifications, and thus see all that has been patented on that head.

By sect. 6, The Lord Chancellor, in certain cases, may seal letters patent after the expiration of provisional protection, when the delay has arisen from accident, and may extend the time for filing the specification thereon, and may also in case of accident extend the time for filing a specification, such time not to exceed one month. This is a liberal and wise provision, and of great value to patentees, who otherwise, by mere accident, might be irremediably deprived of most valuable rights. Such cases have occurred, and some very recently, and the patentee has had no remedy whatever: his patent, however valuable, was absolutely gone.

Doubts having arisen whether the provisions of the Patent Law Amendment Act, 1852, for the granting new letters patent for a further term, extended to the granting new letters patent by way of prolongation of the term of letters patent issued before the commencement of the said Act, by sect. 7, it is provided, "That where an Order of Council for the sealing of new letters patent shall have been made after the commencement of the said Act, the said provision . . . shall extend, and shall as from the commencement of the said Act be deemed to have extended," to the granting of "new letters patent for a further term, as well where the original letters patent were made before as where such original letters patent have been issued since the commencement of the said Act."

In addition to the printed specifications which will be soon available, it is understood that the Indices are in the course of printing, and that in a very few months they will be before the public. Patent Law reform though slow, seems at last to offer sanguine hopes that the great leading principles so long advocated by this Society, will be speedily realised in actual practice.

## COLLECTION OF PHOTOGRAPHS.

This collection has now commenced its circulation, to be exhibited amongst those Literary and Scientific Institutions and Mechanics' Institutes which have made application for it, in reply to the notice a short time since inserted in the Journal. The following route has been drawn out, which admits of the collection remaining at each Institution about a week, and allows three days for its transmission from place to place. Those Institutions to which an asterisk * is prefixed have agreed to the General Interchange of Privileges; so that the members of any other Institution which may have agreed to this interchange, and has not applied for the loan of the collection, may still have an opportunity of examining it when in a neighbouring town.

| | | | | |
|---|---|---|---|---|
| 1. *Woburn, Literary and Scientific Institution | from | Sept. 14 | to | Sept. 26. |
| 2. *Wellingborough, Mechanics' Institution, and Wellingborough Parochial Library and Reading-room | „ | Sept. 29 | „ | Oct. 7. |
| 3. Welshpool, Reading Society | „ | Oct. 10 | „ | Oct. 18. |
| 4. *Whitchurch (Salop), Mechanics' Institution | „ | Oct. 21 | „ | Oct. 29. |
| 5. *Chester, Mechanics' Institution | „ | Nov. 1 | „ | Nov. 9. |
| 6. *Stirling, School of Arts | „ | Nov. 12 | „ | Nov. 20. |
| 7. *Crieff, Mechanics' Institution | „ | Nov. 23 | „ | Dec. 1. |
| 8. *Aberdeen, Mechanics' Institution | „ | Dec. 4 | „ | Dec. 12. |
| 9. *Leamington, Royal Literary and Scientific Institution | „ | Dec. 15 | „ | Dec. 23. |
| 10. *Tyldesley (near Manchester), Mechanics' Institution and Mutual Improvement Society | „ | Dec. 26 | „ | Jan. 3. |
| 11. *Macclesfield, Society for the Acquirement of Useful Knowledge | „ | Jan. 6 | „ | Jan. 14. |
| 12. *King's Lynn, Conversazione and Society of Arts | „ | Jan. 17 | „ | Jan. 25. |
| 13. *Exeter, Literary Society | „ | Jan. 28 | „ | Feb. 5. |
| 14. *Wrington (near Bristol), Literary Society | „ | Feb. 8 | „ | Feb. 16. |
| 15. Ventnor and Bonchurch (Isle of Wight), Literary and Scientific Institution | „ | Feb. 19 | „ | Feb. 27. |
| 16. *Dover, Museum and Philosophical Institution | „ | Mar. 2 | „ | Mar. 10. |
| 17 *Ashford, Mechanics' Institute | „ | Mar. 13 | „ | Mar. 21. |
| 18. Hertford, Literary and Scientific Institution | „ | Mar. 24 | „ | April 1. |

Since this route was made out, applications have been received from

19. Greenwich, Society for the Acquisition and Diffusion of Useful Knowledge.
20. Cork, Royal Institution.
21. Bury St. Edmund's, Mechanics' Institution.
22. Salisbury, Literary and Scientific Institution.
23. Falkirk, School of Arts.
24. Wisbech, Mechanics' Institute.

It is arranged so that each Institution will remit it on to the next in rotation; and it is hoped that care will be taken to ensure regularity in this respect, and that the periods fixed will be strictly adhered to. It is obvious that for this the Institutions must depend on each other, the Society having no means of controlling the arrangements beyond that of determining the days on which it is to pass from one to the other. It is scarcely necessary to point out the importance of regularity in this respect; as unless it be attended to, the whole route must be thrown into confusion, and the Institutions disappointed.

The Council, in forming this collection, has had in view to extend as far as lay in their power, a knowledge and appreciation of the art of Photography. They believe, however, that the mere sending the collection with a catalogue, would be a very imperfect step on their part; and that it is necessary that it should be accompanied by something in the way of an account of the principles and processes by which these beautiful transcripts of nature are obtained. They are the more assured of this from the numerous inquiries on this head, which were made by visitors to the Exhibition held in their own rooms, showing how much information was required by the general public. For this purpose the following remarks have been put together.

It is not intended to write a treatise on photography; that would be out of place and unnecessary here; but to give a familiar account of the general principles on which the processes depend. Those who desire to take up the art for practice must look elsewhere for the niceties and detail of the manipulation.

The whole art depends upon a very simple fact or principle—the blackening action of light upon certain salts of silver. We are familiar with this in two forms, in the use of lunar caustic (nitrate of silver), and the common marking ink, also a solution of nitrate of silver. We all know that when lunar caustic is first applied to the skin, or marking ink used, how little, if any, stain or mark is visible; but that in each case, exposure to the light soon renders it gradually darker, till it becomes completely black. This is the simple principle on which the whole depends, though other combinations of silver are used, as more sensitive to light, and for other reasons. This being so, if we take a solution of nitrate of silver, and brush it over a piece of paper, and let it dry, no change takes place in the appearance of the paper. If it be then exposed to the light, it will shortly darken all over; but if, instead of exposing it wholly to the light, a portion of the paper is covered, say with a leaf, or piece of lace, or an engraving, it is obvious that those parts which are shielded from the light will remain unblackened, whilst those which are exposed will blacken; and we shall thus have delineated on the paper the facsimile of the leaf or lace, light on a black ground, or of the engraving, white lines for black, and black lines for the white portions of it. We should have what is technically termed a *negative picture*,—a term which must be carefully borne in mind. Having got this negative picture, it is clear that if we make use of this in the same manner as we did the leaf, lace, &c., and place it on another piece of prepared paper, and expose it to the light, we shall get a reverse of the *negative*,—that is, a picture with the lights and shades as in the original, technically called the *positive*. But it may be asked, How can we expose this negative to the light, as it is clear that the action of the light will cause it at once to blacken all over? This is accomplished by soaking the negative in a solution of hyposulphite of soda, which has the property of combining readily with those portions of the silver on the paper which have not been affected by the light, whilst it has little or no effect on those parts which have been blackened by the light. It, as it were, eats into those parts of the silver solution which have not been affected by the light, forming a soluble compound, which by repeated washings in water, is entirely got rid of, and nothing is left in the pores of the paper but the darkened portions of the silver salts. We have thus a picture which is practically unalterable by the action of light. This enables us to use it in the manner described. It has been found, however, that previous to covering the surface of the paper with the nitrate of silver solution, it is necessary, in order to obtain greater sensibility, and consequently more delicate tints, that the surface of the paper should first be covered with a very weak solution of common salt, and then hung up to dry. The process for taking the positive from the negative is termed *printing*, and there is no limit to the number of positives which may be taken from one negative.

If, instead of laying on to the sensitive paper the object to be copied, we expose the paper to the image formed in the camera obscura, we get on the paper a negative impression of the landscape, buildings, or other objects in front of the camera; from which, after being fixed by the hyposulphite, as before stated, a *positive* may be printed. This, in fact, was the first method employed; but the process was too tedious, too slow, and too deficient in detail, to be practically available. Mr. Fox Talbot, in experimenting on this subject, found out another salt, or combination of silver, which was extremely sensitive to the action of light, and which now forms the basis of every process at present practised, though disguised in various preparations. This was the iodide of silver, with a *slight excess of nitrate*, the iodide alone being insensible to light.

The method, generally known by the name of Calotype, or Talbotype, is shortly as follows: the surface of the paper is covered evenly with iodide of silver, and in this state it will keep any length of time, and is perfectly insensible to light. Previous, however, to use, a solution of nitrate of silver, with a portion of acetic acid and a solution of gallic acid, is applied to it, when it becomes at once extremely sensitive to the action of light. It is then exposed in the camera for a few minutes, depending on the brightness of the day or objects; and on being taken from the camera, the image, of which rarely any trace is then found, is made to appear, or developed, as it is termed, by washing the surface of the paper with a solution of nitrate of silver, mixed with a solution of gallic acid. The image shortly appears; and when of sufficient intensity, the paper is well washed in clean water, and the picture fixed by immersing it in a solution of hyposulphite of soda.

We have thus a negative, which is capable of affording an infinite number of positive pictures by the printing process above alluded to. The specimen enclosed between two glasses, and numbered 64 in the collection, is an example of a negative.

Such is the Calotype or Talbotype process, of which No. 22, by Mr. Fox Talbot, and Nos. 37 to 44, by Sir William Newton, are examples.

In order to make the negative more transparent, and give greater brilliancy to the positives, it is usual to wax the negative, by which greater sharpness and more detail is obtained. This is done by applying the negative to paper prepared as follows:

Take a solution of common salt in water, 5 grains to the ounce, with which brush the paper over evenly and carefully, and then hang to dry; it is then brushed over with a solution of nitrate of silver in water, 60 grains to the ounce, and then left to dry. The negative is laid face downwards on this sensitive paper, pressed tightly down to it by means of a piece of plate glass, and exposed to the light, when a positive picture is produced with the lights and shades as in the original objects; this is then fixed by the hyposulphite solution, as before described.

The *waxed paper process* is that which has been used by Legray in France, and brought to great perfection; the pictures numbered 2 to 11, by Mr. R. Fenton, and 70, by Mr. J. Sandford, have been taken by this process.

The paper is, in the first instance, carefully waxed, and the paper thus waxed is soaked in the iodizing solution, as it is called, consisting of iodide of potassium, bromide of potassium, cyanide of potassium, white honey, sugar of milk, and white of egg, in various proportions, mixed in distilled water, each operator using his own proportions. After soaking for about half-an-hour, the sheets are hung up to dry, and, in this state, they are termed iodized paper, will keep any length of time, and are insensible to light till made sensitive, by being completely immersed for a few minutes in a solution of nitrate of silver, with the addition of acetic acid. The paper is taken out, washed in distilled water, and dried between blotting-paper, and is then ready for use. The image, after exposure in the camera, is developed by plunging the paper into a saturated solution of gallic acid, and then fixed in hyposulphite in the usual way.

There is another process, termed the *collodion process*, which gives great brilliancy of detail, and is, from the rapidity of its action, peculiarly adapted for taking portraits. The pictures numbered 73 to 84, by Mr. P. H. Delamotte, are taken by this process.

A piece of plate-glass is covered with collodion (*i. e.*, gun-cotton dissolved in ether), with which a certain quantity of iodide of silver is mixed. The collodion is poured on the glass, the excess allowed to run off, and the plate of glass thus covered with a thin film of collodion, is plunged into a bath of nitrate of silver, and while wet is exposed to the image of the camera. A very few seconds suffice for the production of the image, which is developed, not by gallic acid, but by pyrogallic acid, dissolved in water, mixed with a certain quantity of acetic acid. We then get a negative image on the glass; but as the film of collodion is very tender, it is necessary before attempting to print from it, that it should be varnished with a white transparent varnish.

Sometimes a film of albumen with iodide of potassium is laid on a plate of glass, which is made sensitive in the same manner as the collodion film, but the process is very slow in its action, though the results are extremely beautiful. The picture numbered 30, by Messrs. Ross and Thompson (of Edinburgh) is thus produced.

## IRON LIGHT-HOUSES.

A cast-iron lighthouse, ordered by the Lords of the Admiralty, was lighted up for inspection a short time since. The tower and internal fittings were manufactured by Messrs. Grissell, the lantern and light apparatus by Mr. W. C. Wilkins, of Long Acre. The lighthouse is intended for the Falkland Islands, and a similar one is constructing for Jamaica, while another was sent some time ago to Bermuda. The form of the present lighthouse is that of a frustrum of a cone, having a height of 47 feet from the base to the balcony floor, and a diameter of 14 feet at the base and 9 feet at the top of the tower, where the plates forming the balcony floor project beyond the body of the tower, and form a parapet around the outside of the lantern, the parapet being supported by eighteen ornamental cast-iron brackets fixed to the shell of the tower. Around the outer edge of the balcony floor a flange 4 inches deep is formed, which shields the connection of the ornamental brackets with the balcony floor, and the whole forms a circular abacus 15 feet in diameter as a capital to the tower. The shell of the tower consists of sixty concentric plates 1 inch thick, with flanges on the inside 4 inches wide, having holes to admit ⅞-inch bolts, drilled every 6 inches apart, both in the horizontal and vertical flanges. In the centre of the tower a cast-iron column is fixed for supporting the lighting apparatus of the Messrs. Wilkins, being a catoptric system of the second class, having fifteen improved Argand lamps placed in the foci of silver-plated and highly-polished paraboloidal reflectors, illuminating an arc of 225 degrees of the horizon; upon this column pockets are cast to receive the T iron joists, which support the two floors of wrought-iron chequered plates, there being an aperture in the floor to allow of sufficient headway up each staircase. The staircase consists of two stringings of wrought-iron, 5 inches wide and ½ inch thick, having pieces of 3-inch angle iron riveted on the inside, to which are bolted the oak treads; to each step there is an iron baluster ⅞ inch diameter, and fixed at the top to a wrought-iron hand-rail 1½ inch wide and ½ inch thick; the staircase winds helically around the inside of the shell of the tower, and is bolted at the top to the T iron joists which support the floor. There are three rooms in the tower, the first having a height of 16 feet 1 inch; the second, 15 feet 8 inches; and the third, 15 feet 3 inches from floor to floor of each room respectively. In each room there are four windows, having strong oak casements; they are 16 inches square and 1½ inch thick, and are glazed with polished plate glass 9½ inches square. The entrance to the tower is by means of a doorway formed in the centre of one of the concentric plates, having a strong oak door opening outwards, as also do the windows. The form of the lantern is octagonal, having a diameter of 8 feet over the corners and a height of 11 feet to the eaves of the lantern roof, which terminates in a cowl of peculiar construction. On the summit of the roof a conical pipe is fixed, in the inside of which is the foot-step or pivot and the guide for the rod of the arrow vane, and fixed to the rod of the vane is a large hollow ball, having the conical pipe inserted into it on the underside, the ball being free to swing round the pipe; the hollow ball is fixed to this vertical rod of the vane, and is perforated on that side next to the feather of the arrow, so that the heated air and gases from the burners may always rush through the perforations into the partial vacuum created behind the ball by the force of the wind. The total height from the base of the tower to the top of the vane is 67 feet 6 inches; the height from the base to the centre of the system of lights is 15 feet; the total weight of tower and lantern inclusive is nearly fifty tons.

## MACHINERY FOR ORNAMENTING TIN-PLATES, ETC.

Messrs. John Smith, William Henry Smith, and Alexander Williams, manufacturers, of Upper Fountain-place, City-road, have just specified their improvements in metallic plates, and in producing devices or ornamental patterns thereon, and in the apparatus and machinery to be used for such purposes. The specification is as follows:—"Our invention consists in, and has reference to, improvements in metallic plates, especially tin-plates, and plates of similar hardness, by giving a superior surface thereto, and by producing devices or ornamental patterns thereon; and in the apparatus and machinery used for such purposes in regard to the specialities in the construction thereof, in order to subserve these objects. We can obtain a superior surface, as hereafter stated, and we can produce devices or ornamental patterns, by embossing or impressing in a continuous manner on the surface of metallic plates any desired device, pattern, or ornament, by means of steel or steel surface rollers, impressed, chased, or engraved when in a soft state with the required device, pattern, or ornament (in reverse of what is intended to be produced on the plate), and afterwards hardened. The plates are to be passed through two rollers, one having the pattern thereon, and the other being a pressure or counter roller; and when it is required to bring the plate out flat, it must be passed through ordinary bending or flattening rollers, which may, if desired, be attached to the first-named rollers. To enable the practical man to construct and prepare the rollers first-named, it will be sufficient to state that they may be of the general form and structure usually adopted for rolling metals, as now practised, the size and form being governed, of course, by the circumstances of the case; and like those for paper embossing, they will be first formed in soft metal, and then embossed, engraved, or impressed by any convenient method, and then hardened. In this invention, however, the pressure, or counter roller, is not to be of hardened metal, but is to be a soft metal roller—for instance, a soft wrought-iron roller, as a hard metal roller would present too unyielding a pressure to the plate under operation, and thus render it difficult to produce the impression required thereon. The two rollers, the hard or impression roller and soft or counter roller, to be connected and geared together, so as to form a pair of rolls as adopted with rollers for rolling metals, and motion communicated in the same manner, and the flattening rollers may be of any ordinary kind.—*Claim*: Having now described the nature of the said invention, and in what manner the same is to be performed, we further declare that we claim in respect thereto the improvements in metallic plates, especially in tin-plates, and in producing devices or ornamental patterns thereon by the use and adoption of the improvement in the apparatus to be used for those purposes, as hereinbefore set forth and described."

## HOME CORRESPONDENCE.

### PATENTS.

### LETTER V.

SIR,—Has it ever occurred to those who advocate patents as the best mode of compensating inventors for their trouble, to calculate how much a year this compensation costs the patentees collectively? Taking even the cheaper rates at which the Crown now sells the article, and the patent-agents advertise their services to procure it, and allowing for a large proportion of them never going beyond the first stage (*i.e.* being abandoned before the second payment to the Crown becomes due at the end of three years), I should think 100*l.* will be quite within the mark as the average expense of getting a patent. And as they seem to be going on at the rate of 3,000 a year, we may pretty safely say, in round numbers, that at least 300,000*l.* is the gross annual quit-rent paid by patentees for the enjoyment of their monopoly.

But there is also another item to be taken into the account, before anybody can be sure that he has got what he has paid his money for—and that is the cost of a law-suit. For it must not be forgotten that the thing called a patent is really nothing more than the right of bringing an action, or filing a bill in Chancery, against anybody whom the patentee considers an invader of his monopoly. And if there is a subject proverbial for breeding litigation (always excepting the lawyer's real friend—the man who makes his own will)—and litigation of the most expensive kind, on account of the battalion of scientific witnesses usually called on each side, and who must be paid for examining the subject in order to give their evidence—that subject is patents. I have not, of course, and probably nobody has, any means of giving a probable estimate of the average cost of patent litigation per year; but it must be a small and simple case of which the cost is under 1,000*l.*: and in addition to those which actually reach a trial, there are many others compromised or referred to arbitration, on account of the notorious uncertainty of the result which the twelve intelligent men in the jury-box may arrive at on a subject which perhaps three of them may understand, and on which the evidence is certain to be flatly contradictory, as that of scientific witnesses and horse-dealers always is.

This sum of about 300,000*l.* a year, then, together with as much more as may represent the annual cost of patent litigation, is the price paid by patentees for the purchase of their tickets in the patent lottery. Now, does anybody seriously believe that the inventors of this kingdom annually receive prizes to anything like that amount by reason of their patents? Of course, I am far from admitting that if they did, that would be any reason for the retention of a system which I believe to be injurious to the public, obstructive to science, and wrong in principle. But, on the other hand, if patents are not on the whole remunerative to inventors (for whose benefit alone they are supposed to be designed), it is clear that inventors as a class are not interested in keeping them up, and that the public is sacrificing itself by the monopoly which it grants to patentees, for the sole benefit of the capitalists who make money by the few profitable patents, and of the various orders of professional men who are engaged in procuring, defending, and defeating them.

It may possibly be said, that if all kinds of speculation are to be stopped which are likely to be unprofitable to those who engage in it, many projects would be stopped which are beneficial to the public, though very unremunerative to the projectors. But there are two very material points of difference between the speculation in patents, and in making Trent Valley and Caledonian Railways, or other works, of which the public gets the use, though the shareholders get no profit. In the first place, these works are not made by taking away any privilege whatever from the public. The only persons against whom compulsory powers are given are the land-owners; and as they generally get three times as much for their land as it is worth, in addition to the advantage of having the use of the railway when it is made, the analogy is certainly not very striking between the interference of a railway with land-owners and the interference of a patent with subsequent or contemporaneous inventors. Secondly, the analogy fails even more in this—that the works in question are at any rate made for the convenience of the public, and the charges for using them limited by Act of Parliament: whereas, patents are exactly the opposite in both respects, giving to the possessors the right to use the invention or to suppress it, solely according to their own convenience, and without any limitation as to the price at which they shall allow the public to have the use of it.

The apprehension which everybody but a very rich man naturally feels of a patent lawsuit, has been frequently turned to good account by the owners of bad or expired patents, or even of no patents at all. It was proved before the Patent Committee to be not an unusual trick for such people to go round to a number of persons whose means, either of standing a lawsuit or obtaining correct information, are small, and to tell them that they are probably not aware that something they are using every day (agricultural implements, these birds of prey seem specially to fasten upon), is an infringement of a patent, and that the patentee is determined that all trespasses on his property shall be prosecuted with the utmost rigour of the law; but in consideration of the infringement having possibly been made in ignorance, he benevolently consents to waive legal proceedings, and to allow the unhappy agriculturist to go on crushing his clods or churning his butter in peace, provided he will pay at once a reasonable sum by way of compromise or compensation. One can easily conceive that the reasonable sum is generally forthcoming, especially as we may be sure it will be ingeniously proportioned to the probabilities of payment or resistance. And considering the difficulty which ordinary people would have in ascertaining whether the pretended patent was or ever had been in existence, and the expense of employing solicitors and patent-agents to search, and that their searches are often fallacious, and sometimes grossly fraudulent; and considering also, not the difficulty, but the impossibility of ascertaining, without a trial at law, whether a patent really in existence is good or bad; I do not see how it would be possible to meet this kind of proceeding by any legislation—except that of abolishing patents altogether.

Even where an action is brought by a *bonâ fide* patentee, honestly believing his patent to be good, though it might turn out to be bad, if properly tried, it is very often the more prudent course for the defendant to pay a largish sum, or to submit to the payment of a moderate royalty to compromise the claim, than to run the risk of an expensive litigation, and of having his works stopped, and an account to be rendered at the end of it by an absurd verdict of a jury, who are generally prejudiced in favour of a patentee, and regard the defendant as probably an evader morally, if not an invader legally, of the patent. I remember the author of a well-known book on patents, who has probably more legal practice of that kind than anybody else, advising a defendant to compromise in an apparently plain case of a bad patent, with the remark, that a jury was as likely as not to find a chemical invention to be an invasion of a mechanical patent.

The converse of this is equally true also. Not only do the possessors of bad or pretended patents often succeed in extorting money under claims of compensation or damage for invasion, but the owners of perfectly good patents fail altogether in supporting them. If a patentee is not rich enough to fight, he may as well have no patent at all. If the invaders are very small in magnitude, and very large in numbers, it becomes impracticable to hunt them down; and so a patent may fail from the poverty of the defendant as well as of the plaintiff. There was a remarkable instance of this mentioned before the Committee: Sir David Brewster said, that if he could have successfully prosecuted the pirates of his patent for the toy called the *kaleidoscope*, which used to be in every house about thirty years ago, he should have made a fortune by it; but that they were made or imported to such an extent by Jews, and small dealers, against whom it was hopeless to carry on legal warfare without spending more in costs than he would recover in damages; that the attempt was abandoned, and the patent therefore practically abandoned too. I say nothing of the somewhat ludicrous spectacle of a man of Sir David Brewster's eminence first being on the point of making a fortune, not by any of his really important scientific investigations, but by an accidental discovery of a plaything; and, secondly, of his just missing it by reason of the invention being such that it could be pirated with impunity on account of the pirates not being worth the powder and shot. But as just the same thing might and would happen with any other more valuable invention, which is subject to the same kind of piracy, the illustration is a perfectly good one of the inadequacy of patent laws to protect one considerable class of inventions from fraudulent invasion, as they are inadequate to protect another set of persons from fraudulent or unfounded claims under pretence of invasion.

There are a multitude of other cases in which there is no manner of doubt that a second invention was entirely suggested by a first which is patented, and yet the second is so different in form that it cannot legally be held an invasion of the first. I mentioned the case of Kyan's anti-dry-rot patent in the second letter.

There are instances—one very famous one—on which, it is said, 20,000*l.* was spent in law, in which there has been no difference between two inventions beyond that of the proportions of the parts, or the distance at which some action was to take place, and yet the second has been held not an invasion of the first; and I do not mean to say wrongly held, inasmuch as a difference of this kind (as was the case in a clock-escapement, about which there was a good deal of controversy, in the Exhibition of 1851) is sometimes quite enough to make the difference between the thing answering and not answering; and yet no human being can fail to see that the second invention is a mere imitation of the idea of the first; and but for the first, might not have been made at all. So that in these cases you must take your choice whether to let the second patent stand for an invention which is clearly not original, or to refuse it because there was a previous patent for the thing which suggested the successful invention, though it did not itself succeed. I cannot see anything like real justice in either alternative; nor can I see how either of the two inventors could complain of injustice if neither of them were allowed to have a patent; the one for the thing which is imperfect, the other for a thing which is not original.

Again, in such cases as that American one which you printed in the Journal of the 3rd instant, it is very difficult, if not impossible, to say on which side the balance of injustice lies. If a man invents and makes a thing only for himself, it seems very unfair that he should some years afterwards find himself stopped from using his own invention because somebody else has since re-invented and patented it, and got the patent maintained on the American ground, that the first invention might be reckoned among the *artes perditæ*. And, on the other hand, if *bonâ fide* inventors ought to be protected by patents, it seems quite as unfair that a *bonâ fide* inventor may have his patent tripped up, as they have been in England, by somebody rummaging out of a closet the same thing which had been made—perhaps an unique specimen of it—fifty years ago, and forgotten ever since.

I am not ignorant that the same may be said, and is said, of other laws as well as the patent law,—that they create the offences they prohibit; that if there were no revenue laws, there would be no such offence as smuggling; that if everybody was allowed to go where he pleases to kill game, there would be no convictions for poaching, and no game-keepers murdered. It is only a pity that arguers of this kind do not go on, as they ought to do, with their own logic, and say that if there were no laws to protect property, nobody would have to be transported for stealing, and that it is by a purely conventional arrangement of society that people are not allowed to settle their differences by gunpowder or arsenic. The short and simple difference between the law of patents and the laws against smuggling, poaching, stealing, and homicide, is, that nobody will venture either to assert that patents are in the smallest degree necessary, or to deny that (until England is prepared to follow the example of "the drab-coloured men of Pennsylvania," or of Spain,) the laws against smuggling are necessary to raise the revenue of the State; that a labourer has no more right to steal the pheasants fed upon the neighbouring estate than the sheep upon the neighbouring common; and that, on the whole, society flourishes better where property and life receive some protection from the law than where they do not.

But this is not all that may be said of the supposed analogy between the frauds and injustice which the patent laws cause or allow, and the frauds and injustice often occasioned by other laws, which are called by the jurists *positive laws*, as distinguished from those founded on natural or moral rights. The revenue laws, of course, are of the positive kind, and in derogation of the *primâ facie* natural right of any man to import or manufacture anything he pleases. And how has the State always dealt with them? Why, as soon as ever it has been made to appear that the expense of maintaining any of those laws bears an unreasonable proportion to the sum which is raised by it; or that in any other way the evils of the tax (and no Chancellor of the Exchequer ever now denies that all taxes are an evil) bear too large a proportion to the advantages, it is at once abandoned and abolished. Apply this analogy to the patent laws, and you will find that, as in every other analogy by which their advocates endeavour to defend them, they are only committing suicide with their own blunderbuss. Grant them on their side (what I do not, in fact) that the patent laws do afford useful encouragement and reasonable reward to inventors; and then consider the annual cost at which these contingent and uncertain rewards are bought; the frauds which the patent laws occasion; their inadequacy to do justice between inventors of the same or similar things, or of things one suggested by the other; the positive injustice which they often inflict by enabling the less meritorious inventor to stop or to supersede the more meritorious one; the general obstruction to science which they cause, and the speculative and gambling spirit which they encourage in inventors, as well as the ignorant and wasteful habit of working in secret, because they dare not ask for information,—I say that no impartial person can doubt on which side lies the balance of inconvenience to the public, and even to the body of inventors themselves.

I am far from supposing that I have said all there is to be said against the patent laws. Perhaps I have even omitted some objections which were made to them by the witnesses before the Committee of 1851; and, by the way, it should be remembered that that Committee only had to decide between cheap patents and dear; and that the question of patents or no patents was only raised incidentally, and was neither tried nor decided by them. Whenever that question does come to be tried, the advocates of patents may depend upon it they will be even more surprised than some of them were when the Chairman of that meeting of the Society, at which I gave my reasons for not patenting my lock,* himself a patentee, both before and since, expressed a strong opinion against the continuance of patents. Considering how very recently the doctrine of no patents has been publicly propounded (in a few speeches in Parliament in 1852), I have been myself surprised at the general disposition which I have found among persons of intelligence and experience to acquiesce in it, as soon as they have had the opportunity and the time to hear and reflect upon the arguments in favour of that doctrine. And even if it is thought premature to talk of abolishing patents until there had been a few years' experience of the new law, I repeat that it is not premature to provide, and with the least possible delay, that, whenever the day shall come for the abolition of patents, thenceforth science and manufactures shall not still remain for fourteen years' afterwards subject to the impediments and interference of nobody can say how many thousands of unexpired patents. And therefore I say, that all the patents now granted ought to be made terminable in fourteen years, or at such earlier period as Parliament may determine that no more patents shall be granted.

Here I had intended to end these letters; but out of respect to Mr. Cole, I will add a few words for the purpose of noticing his letter of last week.

I could quite understand it, and should not have been the least surprised if he had said he was *not convinced* by my answers to the common arguments in favour of patents. But anybody who has done me the honour to read these letters attentively, and still thinks that I have "left the very gist of the question *untouched*," and mentions, as the gist of the question, the right of inventors to protection of their inventions as the result of their labour and as their property, is extremely unlikely to have his opinion changed by either five or fifty more letters such as I could write. And I do not think it would be a very profitable employment of time, even in the long vacation, to write these letters over again in other language, for the purpose of discussing the precise words in which Bentham, Mill, and M'Culloch have expressed the very arguments, or rather dicta (for they are little more), which I have been dealing with throughout, as the arguments in favour of patents.

The fact that hardly any other nation (except Switzerland) rejects patents, which Mr. Cole twice adverts to, and which I had myself alluded to as far as I thought it worth allusion, has plainly nothing whatever to do with the question. It cannot make the evils of patents a bit less, or the advantages of them a bit greater than I have, either wrongly or rightly, represented them to be. It is, in fact, only another form of "the wisdom of our ancestors" argument; by which I fancy that it would be hard to find four persons less likely to be impeded than Mr. Cole and his three authorities, if it happened to stand in their way. We don't usually wait to learn our political economy—of all lessons in the world—from other nations.

I need hardly say I shall have no objection to a discussion of the question at a meeting of the Society whenever it may be brought forward. But I shall not take any step to bring it forward myself, because I think both sides may say what they have to say much better, more deliberately, and with more effect in writing. I shall be very glad to read anything that may be said in reply to these letters, provided it really is a reply, and not either some vulgar compilation of personalities and nonsense or a mere repetition in some new form of words of the old patent arguments which everybody knew by heart long before.

Mr. Jeremy Bentham pronounced from his juridical woolsack, that patents for inventions are "a privilege certainly very advantageous," and "have nothing in common with monopolies." The world is a little older and a good deal wiser than it was in the days of Jeremy; and it is gratifying to observe that Mr. M'Culloch, the most modern of Mr. Cole's three authorities, is much the least positive.

The perception of the evils of patents for invention is undoubtedly of recent growth; but if it proceeds at the rate at which I have been surprised to see it advance within the short time since I first heard it even mentioned, Mr. Brunel and I shall very soon have to express our acknowledgments once more to Mr. Cole, and no longer as a matter of prediction, but of history, for having done so much towards the destruction of patents by cheapening and multiplying them into an intolerable nuisance and obstruction to the arts and sciences.

Yours faithfully,

Ben Rhydding, Leeds, E. B. Denison.
12th Sept., 1853.

## PATENTS.

Sir,—Notwithstanding the voluminous correspondence on the Law of Patents from very able writers which has lately appeared in the pages of your Journal, the exhaustion of the subject is as far off as ever; and for this reason—that the material point has been totally lost sight of; inasmuch, that there is only one body of men who derive any certain and permanent benefit from these laws—the patent lawyers; for the making out of patents and the disputes arising therefrom are a most fruitful and certain source of revenue.

The case is far different with the patentees as a body; for it may be safely asserted that not one in a thousand realises a fortune, and scarcely one in a hundred ever clears his expenses, while to the remainder the patent is all loss: so that the Patent Law is a downright lottery of the worst description, and has been the ruin of thousands of clever, industrious men. The assertion that without Patent Laws we should have no discoveries, is perfectly absurd, and wholly at variance with the constitution of the human mind; and, further, it would be found, could a strict inquiry be instituted, that more inventions have been lost to the public from inability to take out a patent, than ever will be the case should those laws ever be repealed. It is also well known, that more than half the patents of the present day are not taken out for the beauty or usefulness of any invention, but merely for the sake of the advertisement, as well as that only one guinea of the patentee's very heavy expenses goes to the Crown, the rest being wholly absorbed in the vortices of Chancery and its attendant sprites.

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* As the lock has since been pronounced, by what may be safely called the very best authority—viz., in the Rudimentary Treatise on Locks, by Mr. Tomlinson and *Mr. Hobbs*—to be remarkable for its originality and security (the only English lock of which that quality is admitted by the authors), there can be no doubt that a patent for it might have been not merely obtained, but sustained, and made profitable.

The celebrated case of the crank and its substitute, the beautiful invention of the sun-and-planet-wheel, will show, when displayed in its true colours, to what an extent the public is robbed by the cumbrous machinery of the Patent Laws. Messrs. Bolton and Watt were nearly ruined during the first period of their patent by expenses incurred in prosecutions for infringements, and the defence of their patent rights; in addition to which, they had to take out innumerable fresh patents, in order to secure their previous patented inventions: and so insecure did they feel with all their enormously expensive patent system, that they refused admission to view the Soho Foundry under any recommendation whatever. In consequence of their great expenses, they made application to Parliament for an extension and consolidation of their patent rights to twenty-one years, on the plea that they had not realised sufficient profit.

The public had been paying, therefore, an enormous price for their steam-engines for fourteen years, while the profits were being absorbed by the patent lawyers; and was further called upon to endure this state of things for twenty-one years. It would have been far cheaper for the public to have presented Messrs. Bolton and Watt with 100,000*l.* or 200,000*l.*, and have done with the business altogether.

The inevitable conclusion is, that whatever benefits may be derived from these laws by the patent lawyers, none are enjoyed either by the public or the patentees as a body; and that the evils which flow so abundantly from their continuance are counterbalanced by no sterling advantage or benefit whatever; also, that their total repeal after a certain date will no more extinguish the inventive powers of the human mind than an Act of the Legislature could prevent fire from burning.

I am, Sir, your obedient servant,

Henry W. Reveley.

Poole, Sept. 13th, 1853.

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## PATENTS.

Sir,—The advocates of the abolition of patent-right would do well, I think, to look into the subject of copyright in designs, and to aid them in so doing, I will, with your permission, relate a few facts in connection therewith. I must premise by saying, that in effect, at any rate, copyright in designs and patent-right in inventions are identical,—differing only in extent of term; and I believe the opponents of patent-right do not object so much to the term, as to the principle of granting patents at all. For the effect of both is to give an exclusive right for a limited period. The policy of granting such exclusive privileges for inventions is questioned; let us see how the matter stands with regard to copyright in designs. Prior to 1794, England, in respect of copyright in designs, was in that happy state of nature which Mr. Denison and others so earnestly desiderate; that is to say, every man had full liberty to prey on, and pirate from his neighbours, to copy, imitate, and infringe, and generally to do all those mean and paltry acts which begin in individual, but end only in national demoralisation.

"The original seat of calico printing (says Emerson Tennent on Copyright), was at London, and on the banks of the Thames, where it continued to flourish so long as it was a mere manual operation, dependent for its excellence upon the taste and dexterity of the workmen. But when by degrees its processes became simplified, and production facilitated by the application of machinery to that which had formerly been effected by the hand alone, the great mass of the trade was transplanted, about sixty years ago, to Lancashire, the locality in which fuel and labour were to be found in the greatest abundance. The printers of London were then the most eminent in the kingdom for the good taste and finish of their designs; and the productions of that early period are still looked upon as those of 'the old masters of the English school of calico printing.'

"But as the avowed object of the new colony which had sprung up in Lancashire was cheapness of production, not beauty of design, they at once commenced a system of indiscriminate piracy upon the new inventions of their London competitors; and hence the origin of the Copyright Act in England.

"Such was the incredible activity and dispatch (he continues), with which the productions of the London printers were copied in Lancashire, and poured back into the London market, that they were driven to seek the protection of the Legislature against this ruinous piracy, when, after several Acts renewed and amended, a copyright of three months was, in 1794, finally and permanently established. Thus was given, for the first time, the RIGHTS OF PROPERTY to original patterns and designs, which being like the husbandman's spade, the product of labour, skill, and capital, ought to have been equally sacred and secure." However, it was soon found that the term of three months was quite inadequate for the object in view,—for practically, the pirates enjoyed impunity, inasmuch as before the protection of the law could be obtained through the medium of the Court of Chancery, the copyright had expired, and the pirate was at liberty to continue his operations. Sir, it has been contended that if patent privileges were abolished, men would not pirate one from another, but rather emulate each other in producing good inventions. Let us see how it was with designs before the passing of the present law; that is, when a term of three months' (inadequate) protection was given. The principle of property in designs had been established; the law declared it to be an offence to imitate registered designs, though by its delays in administration it afforded opportunities for committing such acts; in spite of this we shall see that a wholesale system of piracy was carried on, and even unblushingly avowed. For instance, a Manchester magistrate, one Mr. Brooks, stated, in his evidence to the House of Commons, that he had been a most extensive copyist of other men's designs; that he did just as many as answered his purpose; that he generally printed his copies on such inferior cloth as enabled him to ask a lower price than the original producer (*i. e.* inventor); that if he had been proceeded against for damages, he would have defended the action, *though aware he was in the wrong*, and have trusted to the length of his purse. And another witness, Mr. L. Lucas, in his evidence, stated that he was in the habit of receiving from abroad patterns of prints, which were reproduced at Manchester, irrespective of the rights of the inventor or original producer. He stated further that he could take any pattern, and find a copyist to print it. It is as well to add, that this gentleman declared himself to be opposed to all copyright. No doubt of it; and I dare say he is equally opposed to all patent right. A Mr. Brooke stated that such was the extent of piracy, that at one time every pattern produced by his house was copied by a rival establishment. Another witness relates how his entire stock was lost by piracy; and another says the consequences of this illegal and immoral copying were ruinous to him, inasmuch as his whole trade was paralysed. That highly intelligent and most clever man, Mr. Applegath, stated "that his business was one of perpetual risk and anxiety; that with every desire to advance the character of his productions by the introduction of art of a higher class, he was deterred from doing so; *that he abstained as much as possible from inventing new designs*, finding it safer to make up patterns one with another, to baffle the copyist, and to make a trade by *it* rather than by excellence;" and further, that he would have produced new designs made by Sir David Wilkie and other eminent artists, but that it was of no use to do so, for they would have been immediately copied, and thus he would have lost his reward. Mr. Denison and others ridicule the notion of any stimulus being wanted to foster invention, and scout the idea of retrogression in manufacture. But what was the case with design? Mr. Barbour, an eminent export agent in Manchester, in his evidence, distinctly states, "that there was a decided falling off in the style of prints in Lancashire, a decline which he attributed to the want of any stimulus being applied to the improvement of design, owing to the prevalence of copying and the reproduction of the same patterns by different printers upon cloth, of unequal quality, instead of producing two distinct classes of quality." Mr. James Thomson, F.R.S., another witness, says, "I have the good fortune to possess a volume of drawings of the period in which pattern drawing is elevated to the dignity of fine art. The art of printing since that time has made gigantic strides, and is now one of the most beautiful and refined of the chemical arts. The art of designing has at the same time retrograded," &c., &c.; and why? The art of calico printing was fostered by numerous patents; the art of designing was open to the copyist; hence the retrogression. The writer I have quoted goes on to say, "At present there is actually a *community* of *property in designs* (this is just what is wanted now in inventions of all kinds), which confounds the most uneducated and the most cultivated genius in one indiscriminate body, confusing all grades of merit, and levelling all superiority of talent. In this position of the trade, to devote extra pains to the composition of designs, is to incur labour and cost without remuneration or repute." Nay, he is bold enough to assert that, unless adequate protection is given, the trade will be engrossed by those who are wise enough to see their own interest in giving such protection. As we all know, the law was altered; a copyright varying from nine months to three years was given, and the effect has been the almost total cessation of piracy, and a very decided improvement in the art of designing. No Act of Parliament, I venture to say, ever effected more good than that of the 5th & 6th Vict. cap. 100. We seldom hear of a trial for infringement of copyright; yet we know that the Act is most extensively resorted to by manufacturers who, indeed, register nearly all their patterns. If, then, it be necessary to afford protection or copyright to designs, which, indeed, are the offspring of thought and labour, but nevertheless of an inferior kind, and of less extent than is Invention in the Arts; how can it be contended that patent right is wrong in principle, unnecessary, and prejudicial? Let us suppose that we have been talking of looms instead of patterns, or of printing instead of designing patterns. Is it to be supposed that manufacturers who scrupled not to imitate and copy designs, would hesitate to copy the improvements of their more skilful brethren in machinery or in chemical art? Is it likely that when a weaver saw that his neighbour had effected some alteration in his loom by which he could produce his cloth a trifle cheaper, that he would abstain from adopting the same improvement so soon as he discovered its nature? To make a new design for calico printing would require no large outlay of capital, and, perhaps, but a very short space of time; yet to copy was found more profitable than to design, and undoubtedly to adopt an improvement in the loom without the trouble or cost of experiment, would be much easier and more profitable than to incur the expense and labour of making one. He that would abolish patent right must extinguish copyright in designs, in sculpture, and in literature, for they have one common origin, and one common end.

I am, Sir,

Your obedient Servant,

A MEMBER.

## PROCEEDINGS OF INSTITUTIONS.

LIVERPOOL.—Last Thursday evening, Mr. Leono Levi delivered the first of a course of lectures on the "Commercial Law of the World," in the Collegiate Institution. Mr. Levi referred to the early systems of legislation of the Greeks and Romans; to the legislation of the Italian States, Mediterranean, and of France; to the Consulato del Mare, and other maritime codes. He completed his review by comparing the present state of the law throughout the Continent and America, and afterwards enumerated the countries which were subject to the law of England. The Rev. J. Saul Howson, who presided, observed, that it seemed to him beyond a doubt, that a knowledge of the main features of commercial law ought to form a part of a merchant's education. He was not alone in that opinion. In a recent tour on the Continent he had visited two large and flourishing schools of commerce; one at Leipsig, and the other at Paris. At the former, the principles of law and political economy, in their connection with commerce, were systematically taught to young men intended for business. At the latter, the mercantile code of France was regularly learnt by heart, and made the basis of farther comment.

MASHAM.—The Mechanics' Institute, in this place as enrolled as members, one in eight, of the population. It has an evening class in successful operation; is supported by all classes in the town, and has recently purchased 150 volumes for the library, from the proceeds of a *soirée* lately held. The opening lecture, for the session, was delivered by the Rev. T. E. Wycherley, Masham, on Tuesday, September 6th, "On Mechanics' Institutes, and the advantages derived from them by the places in which they exist." The Lecturer not only proved how many advantages society generally reaped from them; but, also, the benefit conferred by Mechanics' Institutes on individuals, known and unknown to fame, who had been members of such Institutions. Their inventions, discoveries, and efforts to benefit the class from which they sprung, were placed before the audience in a pleasing style, and commended as examples worthy of imitation.

**Tamworth.** — The Committee of the Tamworth Library and Reading-room have determined to postpone the Annual Meeting of the delegates from the various Institutions, comprised in the Midland Association of Mechanics', and similar Institutions from the 20th instant, the date previously fixed, until Tuesday the 25th day of October next.

## MISCELLANEA.

**Electric Telegraph without Wires.**—Mr. Lindsay, of Dundee, a mathematical teacher, who has for many years followed up numerous experiments on galvanic electricity and the telegraph, has recently delivered lectures in Glasgow, accompanied by experiments, to show the possibility of rendering the action complete without wires, merely employing the water of the ocean as a conducting medium.

**The Proposed Scottish Industrial Exhibition**—The "Interim Acting Committee" for promoting a Great Industrial Exhibition for Scotland have come to the resolution not to attempt to carry out the proposal *next year*, as originally announced. This decision is considered to be "prudent," as the undertaking had not received support and encouragement from those whose names would give confidence to the people of Scotland in a matter of the kind.

**African Cotton.**—A sample of cotton grown near Abbeokuta, on the Gold Coast, has been recently shown to us (*Manchester Guardian*), from which it appears that the green seed variety of the cotton plant—similar to that which produces Upland and New Orleans cotton—grows wild on the coast of Africa, as well as the black seed variety, from which the African cotton previously received in this country appears to have been produced. The sample in question is of remarkably strong staple, and the cotton would be very useful if it could be procured in quantity. The plant is said not to produce largely, but the fault would probably be amended by culture.

**A Flying Chariot.**—A model of a vehicle constructed for the purpose of aërial navigation has been deposited in the Exhibition at Dublin. It is the invention of Lord Carlingford, and, in a communication to a friend, it is attempted to be proved that it fully bears out its right to the above appellation. It is said to have two expanding stationary wings to bear its weight, and two screw wings in front to draw it forward. It does not, however, appear to satisfy its inventor, who is about constructing another with improvements, which is to be much lighter. The scientific world are invited to contribute their mite of information.

**Removal of the School of Design from Somerset-House.**—During the last few weeks the School of Design, with its ornamental casts, and various artistic apparatus for teaching, has been gradually removed from Somerset-House, where, in the rooms formerly occupied by the Royal Academy, it had been located from its commencement, in 1837. The removal is now completed, and the rooms given up to the Registrar-General of Births, Deaths, and Marriages. The School is removed to Marlborough-House, and will form part of the Central School of Art, of the Department of Science and Art. The several district schools already established in the metropolis, at the Mechanics' Institute, Westminster, St. Thomas Chartorhouse Schools, Finsbury, and about to be established in St. Martin's parish and elsewhere, will supply the elementary instruction in art formerly given at Somerset-House, whilst the higher branches will be taught at Marlborough-House.

**Universal Exhibition of the Fine Arts in Paris of 1855.**—The Department of Science and Art at the Board of Trade have issued the following notice to artists in reference to the forthcoming Exhibition in Paris: "The Board of Trade has received information from the Secretary for Foreign Affairs stating that the French Ambassador has communicated to him that a universal Exhibition of the Fine Arts is to take place at Paris, in May, 1855, at the same time as the Exhibition of Industry. The French Government expresses a desire that this Exhibition may be as complete as possible, and that its organisation may be arranged in a manner to give satisfaction to every nation invited to assist in it. The artists' works will be forwarded gratuitously to Paris, and the arrangement of them will not entail any expense on the artists exhibiting. Information of further arrangements will be afforded as soon as they are made. Henry Cole, Lyon Playfair, Joint Secretaries.—Marlborough-house, Sept. 9, 1853."

**Modification of Bunsen's Battery.**—From experiments recently followed up by MM. Liais and Fleury, it has been found that when the diaphragm of a Bunsen battery is suppressed, the carbon being porous, and impregnated with nitric acid, the internal conductibility of the pile is increased fivefold. One simple experiment shows the fact—an element thus modified caused an electro-magnet to support nearly six tons. To arrive at the same result, by increasing the surface of the old pile, it was necessary to connect five Bunsen elements by their similar poles, so as to form one element of five times the surface. To keep the porous carbon impregnated with nitric acid, it is surrounded by a glass cylinder, so as to keep an annular space between, which is filled with nitric acid. The two cylinders are fastened together at their lower ends with clay or cement; the carbon being placed, a cavity may be drilled in it, and by introducing a diaphragm, and charging on the carbon side with concentrated sulphuric acid, and on the zinc side with dilute acid, as usual, the conductibility of the battery is almost the same as in the original Bunsen battery, but the tension is nearly doubled. One element behaves like a Bunsen battery of several elements, but costs much less.

**Ozonometer.**—Dr. John Drew, of Southampton, has recently issued a circular, in which he gives the following description of Dr. Schonbein's method of ascertaining the amount of ozone in the atmosphere. The ozonometer consists of twelve bundles of paper, prepared with iodine and starch; each bundle contains sixty strips, and serves for one month's observations; a spare set is added for additional observations during thunder storms, or whenever the air may appear to be overcharged with electricity. At nine o'clock every morning, a strip of the prepared paper is to be suspended in a spot to which the air has free access, but not the sun. It must be removed from dung heaps, stables, &c., where gases are developed which would vitiate the observation. At nine o'clock in the evening the exposed strip is dipped in water. It will be found to assume a purple tint. The depth of this tint is compared with the corresponding colour on a scale, on which there are ten gradations, and the number is to be inserted in the register with which it agrees in depth. Another slip of paper must be exposed at nine P.M., and examined and registered in a like manner at nine A.M. on the following morning. At the close of each month, the mean is to be deduced, by dividing the sum of the numbers registered by the number of observations.

**The Plough as an Instrument of Culture.**—Mr. Mechi, in a letter to the editor of the *Times*, says, "A calm and rigid investigation and computation have convinced me that the doom of the plough, as an instrument of culture, is sealed; and that the rotatory forking, or, as it is wrongly called, digging machine, is the only profitable cultivator. Even with six or eight horses, it is cheaper and infinitely more effective than the plough. Since the trial of implements at my "gathering," I have received from one of our North American colonies the model of a newly-invented machine, which, by a happy and most simple combination of horse and steam power, will—and I pledge my agricultural reputation for it—not only deeply, cheaply, and efficiently cultivate and pulverise the soil, but at the same time sow the seed, and leave all in a finished condition. It will also, by a simple inversion, cut and gather the corn without any rake or other complication; while both in cultivation and harvesting its operation will be continuous and without stoppage. The implement when complete will weigh about twenty to twenty-five cwt., will require a pair of horses, and will represent the power of about eight to twelve, or more, real horses. The implement for digging will require one man and one boy only, including the management of the steam-engine; in reaping, the same, with the addition of three men to bind as the corn falls into their arms. The men will be carried on the machine. I trust I need hardly say that I shall have no pecuniary interest in this matter. The invention has been duly secured."

QUICKSILVER MINERS.—The diseased forms of the men working as excavators belong only too prominently to a picture of Almaden. You meet men in the streets with wasted faces, feted breaths, and trembling hands—blind, paralytic. The heat in the lower workings of the mine is very considerable; ventilation is imperfect: vapour of quicksilver floats upon the air, and condenses on the walls, down which it trickles in little rivulets of pure liquid metal. Even visitors are sensibly affected by it, and retain for some time the metallic flavour in their mouths. The miners, who number more than 4,000, are divided into three gangs, or watches, working six hours each, and leaving the fourth six hours of the twenty-four—from ten at night till four in the morning—as an interval of perfect rest. On account of the heat, and the deleterious nature of the vapour, summer is made the idle time, winter the great period of activity among the population. As the winter closes, the appearance of the miners begins very emphatically to tell its own tale, and great numbers hasten to their native plains and mountains to recruit. Their homes are chiefly scattered about Estremadura, Andalusia, and Portugal. Crowds of Portuguese, after harvest, flock to obtain employment at Almaden, selling not their labour only, but their health. The most robust cannot work in the mine longer than for about fourteen days in succession, generally eight or nine days make as long a period of such labour as can be endured without rest. Those who exceed that time are obliged eventually to give up work, and breathe unadulterated air for perhaps two months together. If they work without due precaution, and almost inevitably if they indulge in wine, miners at Almaden, aged between twenty-five and thirty, waste away, lose hair and teeth, acquire an insufferable breath, or become sometimes afflicted with tremblings that render them unable to supply their own wants; they have to be fed like infants. If the disease be not checked vigorously, cramps and nervous attacks of the most agonizing kind follow upon these symptoms, and lead on to death. They who work within due bounds, and live moderately, using a good deal of milk, if they take care always to cleanse their persons thoroughly after each six hours' work—the full day's labour—live not seldom to old age. These diseases afflict the miners only. The men engaged upon the ore and quicksilver outside the mines, in smelting and in other operations, do not suffer."—*Dickens's Household Words*.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 9th September*, 1853.

*Dated 18th May*, 1853.

1219. G. Underwood, Strichill, Roxburghshire—Preparation of sulphate of iron.

*Dated 28th May.*

1314. G. Harriott, Islingham, Frindsbury, Kent—Crushing and rolling land.
1324. J. H. Johnson, 47, Lincoln's-inn Fields — Removing gummy matters from fabrics. (A communication.)

*Dated 5th August.*

1828. J. Lallemand, Besançon—Paper from peat.

*Dated 10th August.*

1862. T. MacSweney, America-square, London—Construction of ships.

*Dated 11th August.*

1876. W. Longmaid, 65, Beaumont-square, Mile-end—Manufacture of manure.

*Dated 18th August.*

1897. J. Perkins, Manchester—Manufacture of oils.

*Dated 22nd August.*

1950. W. Schmollinger, Gracechurch-street, and E. G. Smith, Lambeth—Converting reciprocating into rotatory motion.
1952. J. Steven, Edinburgh—Axle-box for railway carriages.
1954. V. E. Warmont, Neuilly, France—Dyeing.

*Dated 23rd August.*

1956. C. Cowper, 20, Southampton-street, Chancery-lane—Permanent way. (A communication.)
1958. M. Poole, Quartz-crushing, &c. (A communication.)
1960. T. C. Medwin, Blackfriars-road—Steam-engine boilers.
1964. W. Mann, Stepney—Purification of gas.

*Dated 24th August.*

1966. A. E. L. Bellford, 16, Castle-street, Holborn—Fire-arms. (A communication.)
1967. B. H. Hine, A. J. Mundella, and T. Thompson—Machinery for textile and looped fabrics.
1969. T. Foster, Manchester—Machinery for etching or engraving on plain or other surfaces.
1970. T. Hill, Glasgow, and A. Thomson — Pipes or hollow articles.
1971. G. Pollard, 64, Watling-street, and G. Mumby, Hunter-street, Brunswick-square—Manufacture of envelopes.
1972. A. E. de R. Hely, Cannon-row, Westminster—Shades or chimnies for lamps.
1973. A. Swonnell, Kingston-on-Thames—Construction of tie for neckcloths, &c.
1974. E. Heard, Regent-street, Lambeth—Composition for rendering sea-water fit for washing.
1975. C. C. Banks, Clapham—Lubricators.

*Dated 25th August.*

1976. A. B. Tompson, Richmond—Spring door-hinge. (A communication.)
1977. W. Austin, 27, Holywell-street—Blocks of plastic materials for building.
1979. G. Davis, London—Apparatus for distinguishing counterfeit coin.
1980. R. A. Brooman, 166, Fleet-street—Machinery for digging, &c. (A communication.)

*Dated 26th August.*

1981. R. A. Brooman, 166, Fleet-street—Treatment of wool and silk, and machinery for same. (A communication.)
1982. E. De Varroc, Great Chesterfield-street—Depriving caoutchouc of unpleasant odour.
1983. R. Wilson, Glasgow—Textile fabrics.
1984. W. Watson, jun., Leeds—Prussiate of potash.

*Dated 27th August.*

1985. R. Roberts, Manchester—Casks.
1986. A. L. Bargnano, New York—Manufacture of paper and pasteboard.
1987. W. Hargreaves, Bradford—Machinery for combing wool, &c.
1988. C. W. Lancaster, New Bond-street—Machinery for manufacturing gun-barrels.
1989. J. Hill, Stalybridge—Spinning machinery.
1990. R. Helbronner, 3, Spring-terrace, Vauxhall-walk, Lambeth—Chemical light, and apparatus for same.
1991. J. D. M. Stirling, The Larches, Birmingham—Rails and tyres.
1992. H. G. Collier, Paris—Rotary pumps.
1994. A. V. Newton, 66, Chancery-lane—Steam-hammer. (A communication.)
1995. Dr. G. Robinson, Newcastle-upon-Tyne—Application of slags and refuse.
1996. E. Lacy, Handsworth, Staffordshire, and W. Wilkinson, Nottingham—A new description of cloth.
1997. J. Hornblower, Poplar—Steering vessels.

*Dated 29th August.*

1998. J. Foss, 15, Aldgate—Printing apparatus.
1999. A. Berend, 3, Fenchurch-street — Instantaneous light apparatus. (A communication.)
2000. J. Cundy, 21, Victoria-road, Kensington—Kitchen range and cooking apparatus.
2001. E. P. Gribbon, Dublin—Window-frames and sashes.
2003. P. A. le Comte de Fontainemoreau, 4, South-street, Finsbury—Improvements in production of electricity. (A communication.)

*Dated 30th August.*

2005. J. Bald and C. Maitland, Carsbridge Distillery, Alloa, Clackmannan, North Britain—Improvements in distilling.
2007. C. Goodyear, Avenue-road, St. John's-wood—Combining India-rubber with other matters for writing, &c. (A communication.)
2008. C. Goodyear, Avenue-road, St. John's-wood — Rules, scales, &c.
2009. C. Goodyear, Avenue-road, St. John's-wood—Coating India-rubber articles.
1010. J. Cundy, 21, Victoria-road, Kensington—Gas-stove.
2011. J. Picciotto, Crosby-square — Burning and reburning animal charcoal. (A communication.)
2012. A. V. Newton, 66, Chancery-lane—Dyeing and bleaching. (A communication.)
2013. W. E. Newton, 66, Chancery-lane—Machinery for cleaning bran in manufacture of flour.
2014. W. E. Newton, 66, Chancery-lane—Machinery for cleaning seeds, &c. (A communication.)

*Dated 31st August.*

2015. E. W. Burrows, Pentonville—Cranes.

2016. A. P. Price, Margate—Treating wash-waters containing soap, and obtaining products therefrom.
2017. T. Dawson, King's Arms-yard, London—Fishing-rods.
2018. G. Meusnier, Paris—Carriage clocks.
2019. E. Smith—Improved manufacture of carpets.
2020. W. E. Newton, 66, Chancery-lane—Reaping-machine. (A communication.)
2021. W. E. Newton—Machinery for making casks, &c. (A communication.)
2022. W. B. Johnson, Manchester—Steam-engines.
2023. H. J. Iliffe and J. Newman—Manufacture of buttons.
2024. J. P. Grazebrook, Audnam, near Stourbridge, Staffordshire—Improvements in working barrels of pumps.
2025. R. A. Brooman, 166, Fleet-street—Paddle-wheels. (A communication.)

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 7th September, 1853.*

569. William Mathews, of Nottingham—Improvements in Pianofortes.
583. Charles Baker, of Southampton — Improvements in moulds for the manufacture of bricks.
588. James Veevers, of Littleborough, and Henry Ashworth, of the same place—Improvements in machinery or apparatus to be employed in the preparing of cotton and other fibrous materials for spinning.
594. Samuel Blackwell, of Oxford-street—Improved strap or band for connecting together certain parts of harness and saddlery, applicable also to other purposes where straps or bands are used.
595. Samuel Blackwell, of Oxford-street—Improvements in saddlery and harness.
598. William Pidding, of the Strand—Improvements in the treatment or manufacture of caoutchouc or gutta percha, in fabrics obtainable therefrom, and in the machinery or apparatus employed therein.
599. George Chambers, of Russia-row, Cheapside—Improved means of gathering cinders and depositing ashes under fire-grates, securing economy in fuel and cleanliness of appearance.
606. Frederick William Campin, of the Strand—An instrument for measuring the steerage way of vessels, and the rapidity of currents of water and air, applicable to ventilating ships and railway-carriages. (A communication.)
636. Thomas Evans, the younger, of Tooley-street—Improvements in the construction of steam-boilers.
640. William Stevenson, of Johnstone—Improvements in the treatment or manufacture of textile materials.
645. François Durand, of Paris—An improved kind of loom.
648. Ephraim Sabel, of Broad-street-buildings—Improvements in the construction of looking-glasses, and in the apparatus connected therewith. (A communication.)
649. George Knight, of Birmingham, and John Hentage, of Warwick—An improvement or improvements in drying bricks, and such other articles as are or may be made of clay.
652. Williams Malins, of Saville-row—Improvements in the application of atmospheric propulsion upon railways.
669. Richard Archibald Brooman, of Fleet-street—An improved machine for weighing or measuring and packing spices, drugs, coffee, and like matters. (A communication.)
688. William Whitaker Collins, of Buckingham-street—Improvements in looms for weaving. (A communication.)
744. Luke Smith, of Littleborough, and Matthew Smith, of Haywood—Improvements in machinery for weaving and printing.
778. John Smedley, of Lea-mills, Matlock—Improvements in machinery or apparatus for opening, cleaning, blowing, or scutching animal wool, cotton, or other fibrous substances or materials.
828. William Johnson, of Lincoln's-inn Fields — Improvements in the production of ornamental surfaces in glass, porcelain, metals, and similar materials. (A communication.)
861. John Fuller Boake and John Reily, both of Dublin—Improvements in signal-posts for railways, and apparatus connected therewith.
919. John Lethwaite, of Halifax—Improvements in rollers or mountings for blinds, maps, and other like articles.
927. Isaac Simpson, of Preston, Lancashire—Improvements in machinery for covering wire, silk, cotton, linen, wool, or any other flexible material, with wire, plate, silk, cotton, linen, wool, or any other flexible material.
940. William Hale, of Swan-walk, Chelsea—New kinds of fire-arms.
950. Richard Archibald Brooman, of Fleet-street, London—Improvements in reaping and gathering machinery. (A communication.)
978. Thomas Knowles, of Newton, Lancashire—Improvements in the machinery or apparatus for picking warps.
979. Frederick John Wilson, of Cadogan-place, Chelsea—An improved wheelbarrow.
1009. Samuel Plimsall, of Pullwood, Upper Hallam, Sheffield—For more thoroughly and effectually cleansing, extracting, and separating or fining ale, beer, porter, bitter beer, India pale ale, and other malt liquors, from the yeast, bottoms, barm, sediment, and other extraneous matters and impurities with which it may be in combination.
1017. James Eagleson Anderson Gwynne, of Essex-wharf, Strand—Improvements in the treatment or manufacture of peat and other substances to be used as fuel.
1150. William Johnson, of Lincoln's-inn Fields — Improvements in machinery or apparatus for sewing. (A communication.)
1190. George Fitzjames Russell, of Duke street, Adelphi—An apparatus for disengaging, lowering, and raising ships' boats.
1310. William Henry Bentley, of Bedford—Improvements in locks and keys, parts of which are applicable to window-sashes and doors.
1403. George Tillett, of Kentish-town—Improvements in portable houses and buildings.
1433. William David Paine, of Thomas-street, Stamford-street, and George Alfred Paine, of Clarke's-mews, St. Marylebone—Improvement in the construction of steam-boilers and in steam-boiler furnaces.
1476. Auguste Edouard Loradoux Bellford, of Castle-street—Improvements in machinery for pulverizing and washing quartz or ore, and for amalgamating the gold contained therein. (A communication.)
1498. George Young, of Neath—Improvements in grinding wheat and other grain.
1553. Richard Archibald Brooman, of Fleet-street—Improvements in printing, or in producing designs and patterns on stuffs and fabrics. (A communication.)
1570. George Arthur Biddell, of Ipswich—Improvements in apparatus for cutting vegetable and other substances.
1611. William Woods Cook, of Bolton—Improvements in the manufacture of woven or textile fabrics.
1630. Louis Brunier, of Norfolk-street, Strand—Improvements in obtaining power by compressed air.
1631. Stephen Martin Saxby, of Brussels—Improvements in apparatus for lowering ships' boats, and for holding and letting go tackle.
1632. Moses Poole, of the Avenue-road, Regent's-park—Improvements in the manufacture of printing-rollers.
1648. Fabian Wrede, of Stockholm—Improvements in gas and air-engines.
1662. Abraham Walker Craig, Daniel Foster, and Thomas Valentine, of Belfast—Improvements in preparing for weaving wet spun yarns of flax and tow.
1667. Arnold Morton, of Cockerill's-buildings, Bartholomew-close, London—Improvements in the manufacture of paints, pigments, and materials for house-painting, paper-staining, and decorative purposes generally.
1677. John Yules, of Glasgow — Improvements in rotatory engines.
1678. William Little, of the Strand—Improvements in the manufacture of lubricating matters.
1685. Charles Liddell, of Abingdon-street—Improvements in moving boats on canals and rivers.
1700. Jacques Rives, of Rue Motay, Paris—Improvements in trusses for the cure or alleviation of hernia.
1701. Benjamin Burrows, of Leicester—Improvements in Jacquard apparatus.
1703. Samuel Colt, of Spring-gardens—Improved machinery for boring metals. (Partly a communication.)
1721. Alexander Cochran, of Kirkton Bleach-works, Renfrew—Improvements in finishing muslin and other fabrics.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Sept. 8 | 3508 | A Tail Pin-breech for Gun and Pistol-barrels | Thomas Turner and John Field Swinburn | Birmingham Gun Manufactory. |
| ,, ,, | 3509 | Improved Jar | Doulton and Watts | Lambeth Pottery, High-street, Lambeth. |
| ,, ,, | 3510 | Button | William Aston | Birmingham. |
| ,, ,, | 3511 | Antigropelos | John Wheeler Jones and William Westley | Bartlett's-buildings, Holborn. |

# SOCIETY OF ARTS.

**FRIDAY, SEPTEMBER 23rd, 1853.**

## NEW ZEALAND FLAX.

The following important communication has been received through the Colonial Department of Her Majesty's Government, in reply to the Circulars which were issued in the spring of 1852. It will be remembered that the object of those Circulars was to establish a correspondence with the various Societies situated in the British dependencies, with a view to obtaining correct information as to their natural resources and productions, and as to the state and condition of the different arts and manufactures; and that by making these known at home, commerce might be promoted, the arts improved, and manufactures extended. It is earnestly requested that any one who can assist in supplying the required information will have the goodness to communicate with the Secretary to the Society of Arts as soon as possible, that no time may be lost in putting the New Zealand Society in possession of the details desired.

Wellington, New Zealand,
24th January, 1853.

Sir,—The Council of the New Zealand Society having received through their President, His Excellency Sir George Grey, your circular and its enclosures, Nos. 1 and 2, of the 26th of March, 1852, addressed to Her Majesty's Principal Secretary of State for the Colonies, have instructed me to acknowledge the same, and to express their highest appreciation of the objects proposed therein, as well as of the obligation under which they are laid to the Society of Arts for a scheme so likely to result in the benefit of this and all the colonies of the British empire; nor can they doubt its ultimate success, when they assure themselves of the reality of the interest which is taken by that Society in all matters relating to colonial produce and industry. They also gladly avail themselves of this opportunity of expressing their warmest congratulations upon the distinguished honour you have obtained in having originated through your Royal President, and fostered by your exertions, the great Exhibition of 1851; a wonder which will never be forgotten, and the immediate successes and results of which are but pledges of what the ultimate results cannot fail to be.

In availing ourselves of the advantages proposed by your circular, I herewith subjoin a statement of the objects contemplated by the New Zealand Society, in which you will perceive that the development of the resources and capabilities of the colony ranks amongst the first. Its objects are—1st. The development of the physical character of the New Zealand group; its natural history, resources, and capabilities. 2nd. The collection and preservation of materials illustrative of the history of its native inhabitants, their language, customs, poetry, and traditions. 3rd. The publication of such papers, on these and other subjects, as may be deemed by the Council of sufficient importance. 4th. The formation of a standard library and museum. 5th. The establishment in the sister settlements of corresponding Societies in furtherance of the above objects.

The Society proposes from time to time, as opportunities occur, to communicate with you on the above subjects, taken in connexion with the objects mentioned in your circular.

Referring now more particularly to the Enclosure No. 2 forwarded with that circular, I may assume, from the communications forwarded from here to the Commissioners of the Exhibition of 1851, that you are already in possession of the requisite information as to the products of this colony, viz., flax, wool, oil, whalebone, timber, gum, copper, iron-sand, sulphur, coal, &c., &c., particulars in detail of all of which I hope hereafter to forward to you in relation to commercial enterprise.

The Council have instructed me now to lay before you the particulars of our most abundant and important product, and to solicit the aid offered by you under the third division of that Enclosure, which offers to afford such information as we may require in regard to implements, machinery, or chemical or other processes necessary to the prosecution of any special branch of industry.

The Phormium Tenax, or New Zealand flax, grows in great luxuriance in every part of the islands of New Zealand; its qualities have long been known to the Colonists, and it has been in use among the natives from time immemorial: it has also been for twenty years an article of commerce, but in small quantities, being only that which has been prepared by the natives and sold to trading vessels which have collected it along the coasts. The flax is contained in the *leaf* of the plant, and is covered by a thick green cuticle. Before the fibre can be obtained, the leaf requires to be decorticated; and a viscous, gummy substance removed, the precise nature of which is as yet unascertained. Hitherto this cleansing has been rather imperfectly accomplished, or at such a cost of labour as to render the article unsaleable at a remunerating price. The principal processes which have been successively employed are Hand-scraping, Machine-dressing, and the Application of Solvents. The first, or *Hand-scraping*, is the only mode that is or has been attempted by the natives. Sitting down and holding the leaf in his left hand, and a sharp-edged shell in his right, the native lays the leaf across his knee, makes an incision across the cuticle, about the middle of the length, and by drawing the leaf under the shell, takes off the cuticle from the incision he has made to the end of the leaf, which he then turns round and repeats, and so concludes the process: scraping more or less according to the fineness he wishes to produce. Second: *Machine-dressing.*—Since the European colonization of New Zealand, various machines have been devised, some of which possess considerable ingenuity, for the purpose of cleaning the fibre. Some of these have been for scraping, others for beating, or stamping it in troughs of running water, and others by steeping and then beating; but up to the present time all have been too costly, and they have all had this disadvantage, that the gum still remained, rendering the fibre intractable and brittle. Thirdly: *The Application of Solvents.*—Attention was then directed to find, if possible, a solvent for the gum; and after many and long-continued experiments, it has been satisfactorily shown that boiling the leaf in clear water is sufficient; but a new difficulty remains. After boiling, the leaf requires washing, as a laundress does linen, by rubbing between the hands, which frees it altogether from the gum, but so increases the expense as to preclude the flax from becoming an article of commerce.

These being facts patent to all persons here, who see almost the whole country covered with this valuable plant, and scarcely any use made of it, the Council of the New Zealand Society have been anxiously considering the subject from their earliest meeting, and have long had in contemplation the offering of a Premium for useful suggestions or machines. Difficulties of various kinds have hitherto prevented this; but they now eagerly embrace the opportunity you have afforded them to secure your valuable aid and co-operation. With a view to this they now take the liberty to ship to your address a ton (1 ton) of coarsely-dressed flax,* in order that any person who may be desirous of trying experiments may have material to work upon: at the same time I would remind you that the plant is growing in various places in England, and amongst others I believe at Kew and Chatsworth.

I am further desired to state that the Council are willing to award a Premium of Fifty (50) Guineas to any person who will furnish them with modes of operation, and models, and specifications of machinery, by which the flax may be dressed at a cost not exceeding *5l.* per ton,† reckoning the wages of an ordinary labourer at *4s.* per diem, and of artisans at *6s.* to *6s. 6d.* The machine to be of two kinds; one analogous to the old spinning-wheel, that may be used in every cottage or shepherd's hut, and the other suitable for more extensive operations.

In requesting you to interest yourselves in this matter for us, I am aware we are imposing upon you an onerous task; but as it is of the precise nature of the objects you propose, and as we greatly desire and need the information for which we ask, we can only hope that you will be as successful in its development as your universal renown leads us to expect; and that it may prove to be an additional and important instance of the extended usefulness of your Society; and that the time may not be very far distant when the Navy and the Mercantile Marine of Great Britain will be supplied with cordage and sails from the hitherto comparatively useless New Zealand Flax.

I am, &c.,
EDWARD ROBERTS, *Hon. Secretary.*

## ANNUAL EXHIBITION OF INVENTIONS.

**The attention of Members, Manufacturers, Patentees, and others, is particularly requested to the subjoined circular relative to the forthcoming Exhibition of Inventions:**

Society of Arts, Manufactures, and Commerce,
Adelphi, London. September, 1853.

SIR,—I am desired to inform you that the Council of the Society of Arts has resolved to open, on the first Wednesday in November next, their Sixth Annual Exhibition of Recent Inventions, whether patented, registered, or not, and I beg to ask if you wish to exhibit on that occasion any model or specimen of your recent inventions or improvements.

The object of the Society in holding these exhibitions is to stimulate and encourage invention, and show the progress of industry during the past year, by placing the works and efforts of ingenious minds prominently before the public. These exhibitions have been visited annually by large numbers of persons, they are open free, and no charge whatever is made for space.

Should you be disposed to send models or specimens for exhibition, I shall feel obliged by your filling in the enclosed form, and returning it to me as speedily as possible. All articles intended for exhibition must be accompanied with a short description for insertion in the Catalogue, and must be delivered, carriage paid, at the Society's House, John-street, Adelphi, on or before the 15th of October next.

I am, Sir,
Your obedient servant,
P. LE NEVE FOSTER, Secretary.

The following is the form referred to, copies of which may be had on application:

Title of Invention .............. ............
Name and Address of Exhibitor.. ............
Description of Article to be sent, whether Model, Drawing, or Specimen .................... ............
Space which Article to be sent will occupy on a floor or counter ............

## SUGGESTIONS FOR THE CONVERSION OF MECHANICS' INSTITUTIONS INTO COLLEGES FOR THE PEOPLE.*

BY HUGO REID.

*Formerly of the Glasgow and Liverpool Mechanics' Institutions.*

1.—All education is *imperfect* that is stopped before the age of from eighteen to twenty years, the time when the mind attains its natural maturity.

2.—At about fourteen or fifteen years of age, the mind *begins* to pass from being light, trifling, feeble, shallow, contracted, as in the child or boy, to being solid, serious, energetic, deep, and capable of a wide range of action, exhibiting in some degree the features which distinguish the man; the character is beginning to take a set, and acquire a rigidity which now increases rapidly; the three or four years following that period are the most precious for the work of the educator; and that education must be considered as *exceedingly imperfect* indeed—in fact, as being nipped in the bud—that is not carried on to about eighteen years of age.

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* This has not yet arrived; immediate notice of its receipt will be given in the Journal.—*Sec. Society of Arts.*

† This price is to prepare the flax as a raw material.

* The substance of this paper was delivered as a lecture in Nottingham in December, 1851; parts of it were brought forward some years since by the author in an article in *Tait's Magazine*. The recent attempts of Mechanics' Institutions to organize themselves into a connected body, and of the Society of Arts to aid and stimulate them, seem to make the present a favourable time for drawing attention to plans for rendering these Institutions more serviceable in extending and improving education amongst the middle and working classes.

3.—A considerable amount of miscellaneous information, skill in some handicraft arts, as writing and drawing, or in certain intellectual arts, as arithmetic, mensuration, reading, and speaking various languages, depending on memory and imitation, may be acquired previous to fourteen years of age.

4.—All this, however, is but a small part of real intellectual education. It is *instruction* only, and that of an incomplete character. *Intellectual training*—meaning thereby the imparting of systematised knowledge thoroughly understood in its proofs, and in the various relations of its parts; the adequate exercise of the higher faculties of discriminating observation, invention, and reasoning in all its varieties; the cultivation of the capacity and disposition for intellectual action, so that a *self-educating* habit may be formed; and the implanting that knowledge and those tastes and powers which will enrich, refine, and elevate the mind, and furnish the means of harmless and rational enjoyments for leisure hours in after-life—this kind of training can scarcely be entered upon before fourteen or fifteen years of age, and the individual must be deprived of it altogether, if his education is cut short at that period.

5.—There is urgent need for extending the period of education to the utmost, from the vast amount of knowledge, bearing closely on our welfare, which has been gathered together since the time of Galileo and Bacon, and especially that, so rich in practical results, accumulated during the last hundred years. Some knowledge of the general principles, leading facts, and more important applications of science is now necessary to constitute an intelligent member of even the humbler ranks of society.

6.—Now, the great mass of the youth of this country are taken from school and sent to business at about fourteen or fifteen years of age (many even earlier); there is no provision for continuing their education during the critical years that follow; it is stopped when just beginning to ripen into fruit; the crowning work is left undone; the character, while acquiring its fixed and permanent form, is deprived of directing influences, and exposed to a crowd of vicious influences, or left to its own blind and imperfect guidance, and the result is, an inferior race, with minds but half-informed and half-cultivated.

7.—This is a crying evil; the individual suffers from it, and society suffers from it. There is a want of some public recognition of the important truth that that education which is ended at fourteen or fifteen years of age is incomplete, and totally inadequate for the proper ends of education. An advanced course of study for those who have gone to business, with the hours and courses expressly suited to their engagements, is a *great educational want*. The public establishment in every town or district of such a course would at once proclaim the principle aloud, and furnish the means of putting it into practice; after it had been established a few years, instead of the *greater part* of our youth spending their leisure time in useless or frivolous pursuits, and a *few* devoting their spare time to self-improvement, and that imperfectly from want of proper direction and opportunities, the proportions would be reversed; the majority would take steps to *truly complete* their education; those who did not, would violate an acknowledged principle and established practice—they would be the exceptions, and would form a rapidly decreasing minority.

8.—The Mechanics' Institution may be formed into a true College for the People, to provide them with such a course, to complete the great work of education.

9.—It does not do so at present.

10.—There is no systematic course laid down, extending over two or three years, and including the leading branches of useful knowledge; there are often no private classes, which should accompany every course of lectures for the more thorough instruction of those who desire to study earnestly; the courses of lectures are too short and in too light and superficial a style to impart solid instruction;—at once *too advanced*, in not going systematically through the elementary parts of the subject, and *too superficial*, in skimming only the leading and attractive features. They are not enough for mental training; something more serious, more solid, more invigorating, more dry and hard, is indispensable, if we wish to impart substantial information, and develope mental power. Such lectures and similar reading are even injurious to a youth at the critical period when the mind should be trained to earnest study, vigorous action, and searching below the surface of things. He forms habits of looking only for amusement or excitement, of studying in a light and careless way, of shrinking from difficulties, of being easily satisfied with such facts and reasonings as are presented to him, of not using the higher powers of his mind; in fact, from not being called forth and exercised, he never acquires the use of these higher powers, never even learns fully the subjects in which he is interested, and remains, mentally, but a half-formed being.

11.—The great educational want here indicated cannot be supplied but by a systematic course of education under a competent instructor and guide, which implies a regular succession of studies entered upon as a serious and earnest work, pursued to their depths and mastered, regular times set apart for the purpose, lessons prepared, and examination—or, at the least, free conversation, with the instructor on the subject of study; one subject completed, and another taken up in order, and so on methodically till the complete course has been gone through.

12.—The Mechanics' Institution may be made to do this without any interference with the purposes to which many of them have been turned—that of supplying rational recreation and innocent amusement. In so far as they do that well, they are highly useful, and succeed in supplying a great want, too little thought of in this country of hard-working, pushing, keen accumulators of wealth.

13.—But the Mechanics' Institution may do much more than this. It has already a "local habitation and a name;" it has lecture-rooms and class-rooms, an organization capable of easy application, to open up and cultivate any new educational field; weight and influence, to make known and recommend any useful extension of its plans; and it is everywhere. These means and appliances are too valuable and too difficult to be raised up anew to be confined to merely providing entertainment. One more effort, and that for a great and worthy end, and the Mechanics' Institution may become a real PEOPLE'S COLLEGE in the only proper sense of the word.

### COLLEGIATE COURSE FOR MECHANICS' INSTITUTIONS.

14.—Let every Institution, which may be fixed on as the centre of a sufficient district, establish a *course of lectures* on the leading branches of useful knowledge, to be given *once a week* in each year from the beginning of September to the end of April, making about thirty-four lectures, and extending over *four years;* so that the student who attends during that time shall have a complete survey of the principal divisions of human knowledge. Let each year's course be complete in itself, so that a beginning may be made by the student in any year, the other courses following in due order; but one order of succession must always be preferable.

15.—Connected with the lectures, and going on at the same time, let there be *private classes*, in which the lecturer meets from ten to fifteen of his students for conversation, more extended explanation, hearing lessons, and examining exercises, all on the subject of the lectures; so that, while the latter give a solid and tolerably complete body of information, and will instruct sufficiently those who attend regularly, more minute and thorough instruction and mental training shall be within the reach of those who may desire it.

16.—There are many different ways in which the subjects may be arranged: the following is suggested as one that might, perhaps, be found convenient. Besides those given below, which form the systematic course, there might be occasional short courses on special departments of some important subject; but those now to be mentioned present a complete body of the rudiments of useful knowledge:

| First Year. | Lectures. | Second Year. | Lectures. |
|---|---|---|---|
| Language | 10 | Natural Philosophy | 24 |
| Arithmetic and Algebra | 12 | Botany | 5 |
| Geometry | 12 | Zoology | 5 |
| | 34 | | 34 |

| Third Year. | Lectures. | Fourth Year. | Lectures. |
|---|---|---|---|
| Chemistry | 22 | Mental Philosophy | 12 |
| Human Physiology | 5 | Political Philosophy | 11 |
| Physical Geography | 7 | Geology | 11 |
| | 34 | | 34 |

Some such *curriculum* is essential. The youth who is ever so desirous to improve himself, does not know what course to pursue. His parents do not know. His college, the Mechanics' Institution, does not point out the way. He rambles about from one study to another, like a person groping in the dark, frittering away his time and faculties at a variety of merely popular lectures and desultory reading, is soon tired of the unsatisfactory results of his attempts in pursuit of knowledge, gives them up in despair, and joins the crowd of triflers.

17.—Let a diploma, or certificate, be given to those who pass an examination on the subjects of the complete course, or even for proficiency in certain subjects only—the necessary instruction for passing the examination being given in the lectures and private classes. But it is not necessary, nor liberal, to restrict this diploma to those who have attended these courses; it should be given freely to all who are able and willing to pass the examination and pay the fees, however or wherever their knowledge has been acquired.

18.—If a sufficient number come forward, the lecturer might be going on with two of the courses, or even three, during one session—the same course repeated to a different class, or otherwise.

19.—Many would attend some particular course twice, as well as some of the special or extra courses that should be given from time to time. With these, and the four years' course, it should be considered that each student ought to be pursuing his education systematically from fifteen to twenty-one years of age.

20.—By regular attendance on the lectures, with occasional reading, each student would acquire a tolerable amount of exact information in the leading departments of useful knowledge, and have his mind led into trains of solid thinking by the various reasonings brought under his notice. This would not occupy him more than about two hours weekly for eight months of four successive years; while, both morally and intellectually, he would derive great advantage from this steady continuous application to study during these critical years. Those who desired more thorough instruction and training would attend also the private classes one hour weekly; which, with one hour's special preparation for the private class, and the two hours already mentioned, would amount to four hours weekly. Besides the private classes attached to the lectures, there should be others, for still more extended private instruction, on the plan carried out so efficiently in the evening schools of the Liverpool and a few other Mechanics' Institutions.

21.—The lectureships might be variously divided—Language, Mental Philosophy, Political Philosophy, Human Physiology, and Physical Geography might be conjoined—the others being in the hands of one lecturer. Or a three-fold arrangement might be adopted.

22.—There should be lectures and private classes in the evening, to suit the arrangements of those engaged in business during the day; but that need not prevent courses of both being given during the day, which might be preferred by females, to whom all the courses should be open.

23.—The desirableness of some such scheme, to enable those who are sent early to business to complete their education, and to aid in rescuing them from frivolity or vice, and from allowing their minds to run to waste, will probably be conceded. But doubts may be raised as to its practicability.

24.—The chief obstacles to the execution of such a plan seem to be the want of funds to carry it out; the interference of business engagements, arising from the long hours of employment; and the exhaustion of the system in the evening, arising from the same cause.

25.—It is not to be expected that such a scheme can be set a-going in any locality, with the slightest prospect of success, without very great efforts at first to give it publicity, to explain and recommend it, to procure for it the public sanction of the most influential and respected names in the district, particularly of parents, guardians, employers, and any others known to have the care of young persons in whose welfare they are interested. If the plan is of any value at all, it must be worth one great effort at introducing it.

26.—Every Mechanics' Institution is provided with a lecture-room, and most of them with smaller rooms (both unoccupied during the greater part of the week), that could be used for private classes; but the latter could be held anywhere, even at the house of the lecturer, or some of the pupils.

27.—If a lecturer gives three lectures weekly to a class of about 150 each evening, at a fee of 10*s.* from each student, here is an income of *225l.*, besides the fees from the private classes. After the system had been in operation some time, this might reasonably be looked for, either in one populous district, or by lecturing in adjacent districts. But this cannot be expected at first.

28.—About a tenth of the population are of the age of from fifteen to twenty-one years. In a district with a population of 100,000, this gives 10,000 who should thus be engaged in completing their education. If we suppose that, by extraordinary efforts, *one* in *twenty-five* out of the 10,000 could be induced to attend the proposed course, at a payment of 10*s.* yearly, this gives at once a class of 400, and an income of 200*l.* If of these, one in four (100) attends a private class, also at 10*s.* each, we have 50*l.* more; making in all 250*l.*, which would be a good beginning for one lecturer. If it were found necessary to begin with two lecturers (and there would be great advantage in beginning it in a thoroughly efficient style), there would be 125*l.* for each; and surely the subscriptions of the district (and perhaps a little Government aid) might be procured to the extent of 150*l.* more for a year or two; making a yearly salary of 200*l.* for each lecturer, which he could perhaps raise a little by other private classes and occasional special courses. Or each might lecture in two or more adjacent districts, and thus, with less extraneous aid, render his situation remunerative. But the plan might be begun with only one lecturer, and gradually extended as its advantages became better known and appreciated.

29.—It would be well worth while for the inhabitants of any district to subscribe liberally to have the education of their youth thus completed, their time occupied rationally, their attention turned to intellectual and refined pursuits. There seems little reason to doubt that if started with spirit, and supported liberally for a few years, the system would soon become self-supporting, even though commencing still less favourably than is assumed above, which would probably be the case in many districts.

30.—Early closing is now becoming general, and would be still more so when its energetic and able advocates could point to so urgent a reason for spare time being allowed to the young in the evenings,—to the improved opportunities of employing that time. This has been rather a weak point hitherto with the advocates of short hours of labour; as, though time to the young for self-improvement was always admitted in a general way to be most desirable, there was no systematic provision for regular and useful employment of that time, no authoritatively sanctioned plan for the purpose, nor any distinct view of how it should be occupied; so that many, parents as well as employers, thought that it would be as well for their youth to be kept engaged at business.

31.—Such is a brief outline of a scheme for increasing the usefulness of Mechanics' Institutions, respectfully submitted to their consideration by one who has now been associated with such Institutions for a period of about twenty years.[*]

## INTERNATIONAL POSTAGE.

At a Meeting of the Council of the International Postage Association, held at the Society of Arts, on the 15th inst., it was resolved, to appoint Colonel Sykes, and Don Manuel de Ysasi (the Honorary Secretary), special Commissioners to attend the International and Statistical Congress now being held at Brussels, under the presidency of Monsieur L. A. J. Quetelet. In a communication to that gentleman, the Council say, that "the experiment of cheap postage, with prepayment by stamp, has been tried in many countries, and always with complete success. In the case of Great Britain the gross revenue from the Post-office in 1840 (the first year of the penny-postage), was 1,359,466*l.*, whilst in 1851, it amounted to 2,422,168*l.*, being an increase of very nearly 100,000*l.* sterling a year, and a larger total by some thousands than had ever before been obtained in one year from postage. The commercial and social effects of cheap postage cannot be so clearly shown as the financial, but some idea of them may be derived from the fact, that the increase of letters passing through the post-office for the year 1852, taken in comparison with the year 1838, was upwards of 304 millions, being more than fivefold. The Association has already obtained from the British Government, as an acknowledgment of the correctness of its principles of action, its declared intention of reducing to a moderate and uniform rate the system of postage between the mother country and the whole of its colonies. The absolute necessity for some systematic arrangement of international postage, and especially some provision for the transit of mails through intervening countries, is strikingly shown by the fact that, at the present time, one-half of the civilised world has no direct communication with the other half. The Association does not presume to dictate, or even suggest to foreign powers what they shall charge for postage, but it submits for consideration the following resolutions, as the basis of a general postal convention: First, That each country becoming a party to the convention shall charge, collect, and retain the entire postage of all foreign letters sent outwards; and that it shall deliver all letters received from foreign post-offices included in the convention free of all charge whatever. Secondly, That each country shall make what charge it pleases on all letters proceeding to foreign countries, but that charge shall be uniform in all things to all countries parties to the convention. Thirdly, We also wish particularly to call your attention to the consideration of some plan by which the transmission of mails through intervening countries, parties to the convention, may be arranged."

## OCEANIC TELEGRAPH LINE BETWEEN EUROPE AND AMERICA.

(From the *Daily News*)

We have it stated to us, says the Bangor *State of Maine*, on the authority of Mr. Robert Stephenson, the eminent engineer, that a recent discovery in telegraphing has been made which may work as great a revolution in the world of letters and of commerce as has been already effected by the original application of electricity or electro-magnetism to the purpose of telegraphic communication, or, in other words, the art of writing at a distance.

To make ourselves understood, it may be proper to say, that heretofore the most scientific observers of facts in electro-magnetism have supposed that there was a limit to the force or strength of the magnetic current upon any given circuit, and that, however perfect might be the insulation of the submarine wire, the blow or shock could not be sent across the Atlantic Ocean. In this belief a project has been formed for constructing a submarine telegraph between Great Britain and the United States by a circuitous route across the various straits and channels lying between the intermediate islands of the Northern Atlantic Ocean. It was proposed to commence this line at the northerly part of Scotland, thence to the Orkneys, thence to the Shetland and Faroe Islands, thence to Iceland, a distance of some 300 miles; thence to the shores of Greenland, thence across land to Davis's Strait, thence across the said strait to the Labrador shore, thence by land to Quebec, &c.

Mr. Stephenson states that a series of recent experiments has established the fact that by forming a complete wire circuit, that is, by two connected wires extended so as to return to the same point of departure, forming a complete metallic circuit, instead of using one wire connected with the ground, the galvanic current may be sent to any conceivable distance without loss or diminution of power. The supposed weakness of the current is to be attributed to its interruption by cross currents, which cross currents are overcome or avoided by the continuous wire circuit.

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[*] Mr. Hugo Reid has had this letter set up in a separate form, with some explanatory notes, and has kindly furnished the Society with copies for distribution to the Institutions in Union: these will be forwarded in the next book-parcel.—*Sec. Soc. of Arts.*

In this way, doubling the expense of the submarine cable, making with it a complete metallic circuit, or double track, by a return line, the galvanic current may be sent, without sensible loss of power, from London to Portland or New York, or at any rate from Galway to Cape Race.

It is known, however, that this principle of a metallic circuit was one of the first ideas in the telegraph; but a subsequent discovery of the fact that one line of wire inserted in the earth made a complete circuit by this means alone, caused the original method to be laid aside, and finally abandoned.

We cannot any longer doubt that the Oceanic Telegraph will be realised, and that a line of wires will yet encircle the whole earth, bringing all parts of it into instantaneous communication with each other. It is impossible for any human foresight to estimate or predict even the results of such a communication; and we trust that the Governments of the United States and Great Britain will take up the matter of an oceanic line on a scale commensurate with its importance — providing such a number of distinct wires, inclosed in one cable, as will supply the necessities of commerce and intercourse between Europe and America.

## DRAWING INSTRUMENTS.

At a time when the camera is attracting so much attention, and photographic images are by its means being produced in almost endless variety, we are too apt to overlook any other mechanical or optical arrangements calculated to facilitate the production of correct representations of objects in nature or art. We would direct attention to the Graphic Telescope, an instrument invented by Mr. Varley, which, although not new, is far too little known, as it affords almost unlimited aid to artists, architects, and draughtsmen. It presents to the eye correct images of any object which it may be desirable to trace, from any direction, and of any size we need. At whatever distance from the eye it may be eligible to place the paper, the images can be placed by which means the image and pencil are made to coincide so truly that both are distinctly seen together, and from this exact coincidence both eyes remain open to see the pencil, though a portion of one only sees the image. By its means also images may be reversed when necessary for lithographic purposes. In the Graphic Telescope the field of view is large, being about as wide as the paper is distant from the eye; and the picture or image may be extended every way by moving the telescope and shifting the paper, there being means of correction when needed. In its use, with a variety of power, we have unlimited choice as to the size of the images we intend to trace, and they may be drawn to the true perspective distance of the picture in which they are to be used. The telescope is peculiar, and differs from all others, it being constructed expressly for this purpose, to be capable of having the lowest powers as well as the highest, and with a large field of view. It may be described as a telescope between two reflecting speculums, by which an erect image is obtained clear of the telescope. The drawing surface may be placed in the most convenient position, either level or sloping, and the instrument can take images from every possible direction. Thus pictures or ornaments on a ceiling may be as easily traced as those in any other position. Mr. Horner, by means of the Graphic Telescope, produced one of the largest panoramas ever painted,—London as seen from the top of St. Paul's, —a task almost hopeless without such aid. To be able to trace a telescopic image, absolute steadiness, as well as lightness, is required, so as to afford facilities of transit from place to place; these the arrangements of the Graphic Telescope have effected; it is the lightest and steadiest instrument that has been provided for such purposes. The whole framing forms a series of triangles so opposed to each other as to produce the required stiffness by construction, and not by weight. The telescope, when prepared for use, is placed on a pyramidal stand, forming a stiff base, and holding it steadily over a table. Not only may portraits, animals, sculpture, shipping, and buildings, be correctly traced, but they may be drawn to an exact scale without measurement. Thus a most useful tool is provided for artists, by which valuable time may be saved, and correct sketches made of all difficult subjects. It will also frequently find views of places too distant to be regarded by the unassisted eye.

## HOME CORRESPONDENCE.

### PATENTS.

Sir,—The summary of Mr. Denison's argument, if I understand it rightly, is this: "that the world would be none the worse for the total abolition of Patent laws.' This conclusion he rests mainly upon the supposition that in the absence of any "encouragement" to inventors, useful inventions would be just as plentiful as they are now, inasmuch as invention is a natural faculty of the human mind, and not the offspring of any legislative enactment.

Now it seems to me, that plausible as this appears, there is a fallacy at the root of it. It is true that the inventive faculty is natural to some minds, and that it would be so without as well as with Patent-laws; but does this prove that inventions would be *brought into use* without some special advantage to their inventors? Mere invention, that is to say the idea of a thing, however good, is of small value,—it is the practical development of the idea that is really valuable; and it is therefore a fallacy to say that the world would not lose by the abolition of Patent-laws, because they do not increase the number of "inventions." Perhaps Mr. Denison thinks that a good invention will of necessity work its own way. This is contrary to general experience. Mechanical, or, perhaps, I should say physical, truth travels not more rapidly than moral truth,—unless it be pressed forward by some energetic personal agency, it is apt to lie long "*in petto*," and stands good chance of oblivion.

For the sake of meeting Mr. Denison upon his own ground—that of *expediency*, I will pass by the "natural right" question, only remarking, that believing as I do that, as Sterne coarsely phrases it, "a man has as much right to the exudations of his brains, as to the breeches upon his backside," I cannot see the *justice* of an argument which seeks to deprive the inventor of any benefit from his own inventions beyond that which he may derive from the general progress of society consequent upon the use of them. Even if the inventor's "natural right" could not be proved argumentatively, I would still rest upon that innate sense of right and justice which fortunately for humanity sometimes transcends all merely logical deductions.

The infinitely lower question of *expediency* is a fairer subject for argument. Unless it can be established as the duty of every one to contribute all his possessions and knowledge to the common stock of society,—to argue in favour of the spoliation of individuals for the advantage of the community, is an offence against the fundamental principles of social morality.

Before I proceed farther, I wish to remark, that much of the difficulty of this discussion arises, as it so often does in arguments, from the too general use of terms. The term "invention" is one of very wide signification. Setting aside its literary uses, as being beside the present question, it includes many ideas in its application *to things*. The invention of machines, of compounds, and of processes, are so many distinct manifestations of the inventive faculty, and it is no fair argument against Patent-laws (viewing them as encouragements to invention), to assert that any *one* of these manifestations would not be injuriously affected by the absence of "encouragement." The scientific chemist must not be played off against the mechanist, nor the improving manufacturer against the amateur or the man of science, just as it may happen to meet the exigencies of an argument. In what I have to say, I shall use the term "invention" as signifying *the practical application of new and useful ideas to material things;* by the term "inventor," I mean one who so applies ideas (not the mere idealist), and by "Patent-laws," I shall understand any Legislative enactment in favour of such an inventor.

The question to which I now address myself is, "Whether or not it is *expedient* that society should give legislative encouragement to inventors?" I maintain the affirmative. Firstly, because society thereby obtains the benefit of inventions that would not otherwise be brought into use. Secondly, because it obtains the use of good inventions *sooner* than it would do in the absence of encouragement to inventors. If I am successful in proving these propositions, I shall consider that I have made out my case; for I believe it to be altogether unnecessary to the present argument to prove that good inventions are beneficial to society, or to show that legislation is the best mode of encouraging them. I have asserted that society, by means of patent laws, obtains the benefit of inventions that would not otherwise be brought into use. It is obvious that under the patent laws as they exist, every one is as free to make his inventions public as he would be were those laws done away with. If therefore I could show that only a few inventions are brought into use, besides those voluntarily made known, the preponderance of argument would be in favour of patents. It is no valid objection to this view that patents may be the means of causing inventions to be kept secret; because, as Mr. Denison has ably shown, it is almost *impossible* to keep an invention secret, using the term invention in the sense which I have attached to it. As we are discussing a matter of "expediency," it is no degradation to the argument to say, that by making invention a matter of personal interest to the inventor, he is more likely to develope his peculiar faculty than if he had no such inducement. That this agrees with facts I can assert rom my own knowledge. A considerable amount of fallacious argument has been founded upon the supposition that the persons actually engaged in particular manufactures or employments are those who, as knowing most about the requirements of their respective ccupations, originate the most useful inventions. Nothing can be more erroneous than this as the basis of n argument; yet the assertion has a sufficient amount f truth in it to make it available as a weapon in the hands of a skilful disputant. The manufacturer may be n inventor of improvements in the details of his business, and may be either capable of inventing, or willing to adopt, processes tending to diminish the cost or improve the quality of the article which he produces; but it is quite clear that he would have no interest in putting forward an invention which might supersede his own productions, or so simplify them as to render them less profitable. Accordingly, the manufacturer in any line of business (unless he makes patenting a part of it) is not generally, nor even frequently, the inventor of things new and valuable, when tried by the tests of utility and economy to the general community.

There is another reason why persons specially engaged in particular employments are not the most likely to originate strikingly new and useful inventions, namely, that their ideas are confined by the traditions of their business. Accustomed by long habit to think that everything with which they have to do must be done in a certain manner, or fearing to risk a failure, or to derange their affairs by departing from established modes, such persons are the last, rather than the first, to adopt new discoveries, which in fact do not usually make their way through the medium of established agencies, but by the establishment of new ones. It is to the man of science, and the so-called "schemer," rather than to the established manufacturer, that we must look for really useful novelties in invention.

Of these two classes of inventors, I think I may fairly take Watt and Arkwright as examples. Watt—a man of good attainments in science, but employed as a mathematical instrument maker—went out of his own particular line of business to invent an important improvement in the steam engine. Arkwright—a barber by profession, and a schemer by choice—employed his leisure in inventing a spinning machine, which has been of incalculable benefit to the whole world. Both inventions were patented, and if both inventors realised princely fortunes by them, surely that society which has been so largely benefited has no right to grumble at its benefactors. This remark, however, is digressive. But it may be said that Watt and Arkwright would have invented all the same if there had been no such thing as patents. Can any one, however, who knows the difficulties that Watt had to contend with in getting his engine into use —that he and his partner expended an enormous sum before they realised any return whatever; and that Arkwright invested a large capital for five years without any profit;—can any one knowing this, assert that the Patent Laws which gave to Watt and Arkwright the opportunity and the encouragement to make a large outlay on their useful inventions, and to suffer much personal inconvenience, in the hope of obtaining a profitable return, were not the real and principal causes (next to the powers of the inventors themselves) of all the benefit which society has since derived from the use of their important inventions? It is morally certain that neither Watt nor Arkwright would have found a capitalist willing to embark his money, in order to bring out their inventions, without some such legal guarantee or security as that which is offered by the system of patents; and it is equally certain that without pecuniary assistance those inventions could not have been successfully introduced. The eagerness with which rival engineers and manufacturers pirated them when their utility had been practically demonstrated, does not prove that they would have taken them up if that utility had not been so demonstrated. I repeat, what I have already advanced, that the mere inventive idea is of small value compared with the practical application of it, for the same idea may occur to many minds, yet be of no public use whatever: until it occurs in a mind which is capable not only of conception but of application, that is to say, in the mind of a *true* inventor, it is of no social utility; it is but the intellectual pastime of individuals. Had not Watt understood the practical value of the "condenser," and given up his time and energies to carry it into actual use, it might, like Hero's toy, have had no higher result than to furnish scientific amusement to select circles for an indefinite period.

Thus it will be seen that patents have, in *two* instances at least, induced inventors to devote their time and energies to the practical development of useful ideas, and enabled them to obtain the assistance without which that development could not well have taken place. These two cases are in their principal features types of a large class: if the conclusion at which I have arrived be true of the type, it is true also, with some allowances, for the whole class; and therefore it is *expedient* for society that it should give legislative encouragement to inventors, in order that it may obtain the benefit of inventions, that without encouragement would not be brought into use.

I have now to shew that by Patent Laws society obtains the use of good inventions *sooner* than it would do in the absence of any such encouragement to inventors. This proposition is in fact little more than a part of the preceding one. I have given it separately, chiefly because it may appear to some persons, that to grant a monopoly of an invention for fourteen years, which is the form of "encouragement" provided by existing patent-laws, is not the method most likely to give to the public the earliest use of any invention. I grant that this supposition may be in a measure true; that there may be better methods of encouragement, but consequently, in endeavouring to show the advantage to society even of a fourteen years' monopoly to an individual inventor, I submit that I am coping with the most objectionable form in which patent-right can be presented. There is, perhaps, no instance in the history of patent-law that an opponent of my views would more readily advance against me than that of the patents granted to Arkwright for his invention. Arkwright was undoubtedly a "schemer,"—a man who set to work upon his invention with the hope of making a fortune by it, without any of that large benevolence which is so often attributed to the man of science, when he makes known his discoveries. Arkwright was not even the *first* inventor of the method of spinning which he brought into use, and as is well known, his patents were after a time set aside; in consequence of which the inventions came into general use sooner than they might have done, if the patents had held their ground. All this is true, but it does not weigh one grain against my position. Had not patent-laws existed, Arkwright would probably not have invented at all; certainly he would not have brought his invention into use so soon as he did, nor would he without a patent have obtained the pecuniary assistance which enabled him to prove the practicability of his invention, and to overcome the prejudices which had arisen from the failure of Paul and Wyatt, the inventors of spinning machinery, who had preceded him. Almost exactly the same argument may be applied to the circumstances of Watt's invention, and to other almost innumerable instances wherein self-interest has been the immediate cause of the promulgation of inventions. In short, the more strongly it can be made to appear a matter of personal interest to invent, the sooner inventions will be made, and the sooner will the public have the use of them. But the strongest argument in favour of my view is this, that no one is so likely to use the energy necessary to force an invention into use as the inventor himself, to whom in most cases it appears more valuable, than it does to anybody else. Even if he should not have the means or the habits of business necessary to carry it into use himself, he will tell his tale till somebody listens to him who possesses those qualifications. Too often has the poor inventor found the fourteen years all too brief a period to induce the world to receive the fragment of truth which it has been his mission to promulgate, and which but for the hope of ultimate reward, he would long before have allowed quietly to pass into oblivion.

The Conservative feeling is so strong in society, that scarcely any other principle than personal advantage is sufficient to inspire the energy which shall triumphantly advance anything new, however good, in the face of existing interests, and the inertia of ignorance and indifference; and thus perhaps the very length of the period for which the inventor now obtains his monopoly, may be necessary to ensure his persistence for the length of time requisite to the development of his invention. Be this as it may, unless it can be distinctly shown that the manufacturer whose business it might interfere with—the man of science, who habitually sows pearls broadcast, or the amateur, who invents for amusement, would have more interest in bringing a good invention into speedy use than a man whose legally recognised business and personal advantage it may be to invent, and to bring inventions into use, I shall consider it proved that it is *expedient* for society to recognise and encourage the inventor, as such, whether he be man of science, manufacturer, amateur, or schemer, in order that it may have the benefit of good inventions *sooner* than it would otherwise obtain it.

I have done with argument for the present. Before I conclude this perhaps already too long epistle, I will venture to say a word or two on behalf of the much abused schemer;—the man who, because he sometimes happens to see a little farther than his neighbours, is complimented with the title of Visionary. It is not surprising that men who seldom or never travel beyond the ordinary curriculum of human learning, nor ever transcend the comparatively limited sphere of formulised knowledge, should ridicule the adventurer who strikes into the unknown, and who deals with influences and correlations which have not as yet been reduced to rules or scientific expressions. The poetry of invention has little charm for them; but the real man of science, who has a mind which uses its methods as implements, not allows them to become fetters, and who knows by experience how much there is that he does not know, should not—and I think seldom does, except from jealousy as to pecuniary advantages—quarrel with the successful inventor because he may not travel exactly by the same road as himself; nor should he call him by names calculated to bring him and his inventions into contempt.

No man can be a successful inventor without a course of laborious thought and observation. I am very incredulous as to accidental discoveries. There cannot be *many* such, if any, without the existence in the discoverer of a mind capable of appreciating the value of facts presented to it for the first time, and trained to reason upon the relations which they bear to others previously known. Even the humblest schemer, the intelligent workman, is a man to be encouraged and not decried; to be instructed, not put down, nor robbed of the fruit of his mental labours. The same argument which supports the case of manufacturers improving their respective productions or processes, by means of their special knowledge of them, holds good also for the working man, whose knowledge is equally special. That that knowledge is, in most cases, both as to master manufacturer, and workman, *too* special, is only a reason why they should be encouraged, instructed, and endued with the power of generalisation, so far as that power may be imparted or developed.

When science and special knowledge go hand in hand with inventive genius and the energy which self-interest inspires, then will the best results of invention be seen. The time is certainly coming, and indeed is already partly come, when the mere knowledge of what has been said and done in past ages must bow respectfully before the advancing influence of the true inventor—he who discovers social wants, and shows how they may be supplied in the most efficient manner, and with the least expenditure of means and labour; when the question will not be, "*Shall* such a man be rewarded?" but, "*In what way* may society *best* testify its gratitude to one who is so obviously and so greatly its benefactor?"

I am, Sir, faithfully yours,

Hastings, Sept. 6th, 1853. J. R.

## PATENTS.

Upnor Lodge, near Rochester,
18th September, 1853.

SIR,—I have read with great interest the several letters of your correspondents Messrs. Denison, Reveley, Cole, and a Member, on the subject of Patents: although each has advanced strong arguments in support of his opinions, none have suggested a plan to obviate the evil complained of or attempted to justify.

Permit me to offer a mode of preventing much litigation, and still secure the right of every honest inventor to protection from piracy, and the country as well as the individual from pecuniary loss, which points are the subjects of contention. If a Court were established for the *reward of merit*, to be composed of two practical engineers, two practical chemists, two clever draughtsmen, one experienced surgeon, one lawyer, two clever mechanics, two manufacturers of cotton or other fabrics, and two carpenters, with power to call in other assistants on particular occasions, these said persons to be fairly and liberally remunerated for their time and services, and be required to attend regularly at stated hours every week, at some office hereafter determined upon, the same Court to be made self-supporting after the following manner, I think it would go far to set the subject at rest.

Let every inventor have the right of depositing a written description or specification of his invention, on payment of five shillings at the time of leaving the same, sealed up; the said specification not to be opened unless a full quorum of the Court is present, and then to be read aloud in Court for all to hear, after which the said specification to be entered on the records or book kept for the purpose, and a further sum of five shillings paid for the entry. After the said copy is made, the Court shall examine previous patents and entries on the same subject, to ascertain whether the said invention be new or not, and if of opinion that it is not new, to acquaint applicant of the same, and refer him to the record, and allow him to read it on payment of one shilling, or to have a copy of the specification on payment of a sum fixed by scale. Every applicant shall be deemed the inventor who makes the first application, and having obtained a receipt from the Court that his specification is recorded, and a copy being handed to him thereof, the same shall take priority of every other like specification; in which case, the inventor shall be remunerated in the following manner. The Court shall grant licenses to every person who shall apply for them, on payment of such reasonable sum hereafter fixed for the copy of the specification, and a further fixed sum per annum, according to the nature and utility of the said invention. And if another person shall improve substantially any invention so recorded, he shall receive such remuneration in the form of royalty or commission as the Court shall think him fairly entitled to, out of which licenses and royalty the Court shall receive a moiety, towards payment of salaries and other charges, and pay over the balance to the inventor. If any person should infringe or pirate the inventions recorded, the Court shall sue and prosecute him at its expense, and receive such damages, or payment for damages, as a jury shall award, so that the inventor shall be held harmless and free from all law expenses.

Supposing some such course as the above were adopted, it would give the inventor of every denomination a fair chance, whether he were rich or poor; it would protect him from litigation, spare him much anxiety and trouble, stimulate invention, benefit the country as well as the individual, prevent men of no talent from pirating the talented, set at rest endless disputes, and remove many obstacles to improvement. Allow me to add, I have had more than thirty years' experience in commercial matters in the City of London, that I know something of the effect of patents practically, and have witnessed the unblushing effrontery of many men claiming that which they have not the talent to invent, or understand when invented, and still have the reputation of being clever, from the appropriation of others' inventions.

I am, Sir, yours truly,
JOHN ROBERTS.

## PATENTS.

SIR,—I would suggest to Mr. Denison, that the John Stuart Mill, quoted by Mr. Cole, is a "modern," and the foremost logician in England, and not a contemporary of Jeremy Bentham, save that he was born during his, Mr. Bentham's, lifetime. Mr. Denison apparently confounds him with the elder Mill, Mr. James Mill, his father, the historian of British India. It is well to substantiate facts, if we cannot do so by opinions.

The name of Jeremy Bentham calls up that of his relative, Sir Samuel Bentham, one of our most original men, who was the originator of many public improvements that unscrupulous people have assumed to themselves, and built a repute upon, not having the fear of a patent registration before their eyes. It is scarcely in good taste to speak irreverently of Jeremy Bentham.

Mr. Denison quotes the opinions of Messrs. Tomlinson and Hobbs, in favour of the "originality and security of his lock,"—are these "arguments" or "dicta"? —and gives unpremeditatedly a most remarkable admission of his own—the impulse of truth overpowering the habitual caution of the pleader.

Mr. Denison, speaking of his lock, says:

"There can be no doubt that a patent for it might have been not merely taken out, but sustained and made profitable."

This, then, sweeps away every shred of Mr. Denison's arguments, based on the score of patents being a nuisance to their owners, on account of the impossibility of maintaining them at law. By our legal opponent's own admission, it is possible, "to take out, sustain, and make profitable" a valid patent. If it can be so in one case, it can be so in one hundred, or one hundred thousand cases. Inventors ask no more. Mr. Denison's heart is better than his head, though, perhaps, he will not take this as a compliment. He bounces out with the truth under impulse, when he did not mean it. The possibility of recompensing an inventor by a patent being admitted by this opposing champion, we have only to deal with the question of the advisability.

Another such admission, and the inventors will put Mr. Denison and his junior, Mr. Brunel, out of court; and possibly he may take the other side, and set to in earnest to show how the law may really accomplish, what, at present, it only pretends to accomplish.

To follow the ins and outs of irregular argument is not instructive. I will endeavour, with my first leisure, to set out categorically the argument of the inventor patentee.

I am, Sir,
Yours faithfully,
September 24th, 1853. COSMOS.

## LIGHTING.

Bristol Athenæum, Sept. 16th, 1853.

SIR,—Our Directors are now erecting a new and commodious building for the purposes of an Athenæum, and will feel greatly indebted to any of your readers who will communicate to them (directly or through the Journal), their views on the best mode of lighting the interiors of the lecture and reading rooms. The dimensions of the former are 62 ft. by 32 ft. 6 in., and 22 ft. high; the latter 55 ft. by 32 ft. 6 in., and 22 ft. high.

The ventilation has been well provided for, and the reading-room will be warmed by three open fire-places, in addition to hot air. Economy is desirable, but efficiency indispensable.

Yours faithfully,
EDW. HALSALL,
*Hon. Sec.*

## PROCEEDINGS OF INSTITUTIONS.

DUNMOW.—The President, the Rev. C. L. Smith, commenced the lectures of the season at the Literary and Scientific Institution, choosing for his subject the various schemes for cutting a ship canal through the isthmus which connects North with South America. He showed the vast importance of such a work, and detailed the singular facilities which it would give to navigation. Though the idea of it had entered into the minds of Charles the Fifth of Spain, and William Pitt, of England, the work had been delayed by various circumstances, which he detailed. One prejudice against the attempt arose from the supposition that there was a great difference between the mean levels of the Atlantic and Pacific oceans, even Humboldt having estimated this difference at nine feet, whereas it was but two feet. The unhealthiness of Darien, which was hardly yet explored, had been greatly exaggerated, and would doubtless be much lessened by drainage and cultivation. He described the various routes proposed for the canal, viz.: 1. The Tehuantepec route; 2. That by Lake Nicaragua; 3. That from Chagres to Panama; 4. That from Carti to Chepo; 5. The Darien route, or that from Caledonia Bay, or Port Escoces, to the Gulf of San Miguel; and 6. That by the Atrato river to the Bay of Cupicà. Of all these the Darien route was the shortest but one, and was free from the great disadvantages which more or less beset all the others. The canal here would have noble natural harbours at either end, and would require no deep cuttings, and no locks; the river had no bar at its mouth, and need not be dammed nor dredged; the coasts were comparatively calm, and free from shoals, rocks, and kays; no volcanoes were near, and earthquakes were unknown. Ships would pass either way in six hours with the ebb or flow of tide, running no chance of collision with each other; and the channel when once made, would be kept clean and deep by the continual movement of the sea. He next described the surrounding country, its inhabitants, its vegetable products, which were very magnificent, and its minerals. Lastly, he discussed the probability of the canal being worn into a strait, sufficiently wide to divert the Gulf-stream from the shores of Europe: in this case, the climate of Britain would be reduced to that of Kamtschatka, which lies between the same parallels of latitude; but such a catastrophe, if it ever occurred, could not be brought about in less than centuries of time. He concluded with hoping that this grand project might be speedily commenced, in order not only that the conveniences and luxuries of life might be augmented to us, but that all the blessings of civilization and religion might be spread among the now barbarous lands of the Southern seas.—Viscount Maynard, the Lord-lieutenant of the county, has most liberally given to the Literary and Scientific Institution, a site for a building; it is proposed to raise the capital required for its erection by shares.

EXETER.—The inauguration festival to celebrate the opening of the Royal Public Rooms, in this city, by the Exeter Literary Society, took place on Wednesday week. For some time past it had been found that the Athenæum, in which the Society had carried on its operations, was greatly inadequate to accommodate its numerous members. Various circumstances, however, prevented their removing into more extensive premises till recently, when the Royal Public Rooms having changed hands, they availed themselves of the opportunity of securing that eligible building for a term of years. Shortly after seven o'clock the chair was taken by the President of the Society, John Sillifant, Esq., who was supported on his right and left by Sir John Duckworth, Bart., M.P., Edward Divett, Esq., M.P.; the Right Worshipful the Mayor of Exeter (R. S. Cornish, Esq.); Sir Stafford Henry Northcote, Bart., C.B.; Sir John Kennaway, Bart.; R. Durant, Esq.; M. Kennaway, Esq.; Dr. Shapter; Dr. Miller; R. W. Fox, Esq., &c., &c. The CHAIRMAN observed that he was glad that their occupation of the noble room they were now assembled in had been adjourned to a period when he could point to the medallions on the walls, and tell them that a working-man, who was amongst the first originators of the Society, had exhibited his art in those productions: and further, that a painting which adorned the walls—a copy of a group by Ansdell—proceeded from the pencil of a working mason, a member of their Society. He reminded the members that they must not depend upon lectures alone, but that they should in the library and in the class-room prepare their minds to receive the benefits which the lectures were intended to confer. It was in vain to use the purest and richest seed unless the ground was cleansed and cultivated, and that must depend upon the exertion of each individual member. Mr. DIVETT, M.P., and Sir J. T. B. DUCKWORTH, Bart., M.P., next addressed the meeting; after which Sir STAFFORD NORTHCOTE, Bart., rose and said that he was particularly glad to see that the time was passing away when there was any jealousy on the part of those who had received a liberal education, of that education being communicated to the whole mass of the people. Time was when people looked upon the possession of certain exclusive information, certain mysteries of their craft, as the means of success, but that time had passed away. In conclusion, he earnestly hoped they would never entertain the idea that England was to be regenerated either by Mechanics' Institutes, or Literary Societies. The only way in which England was to be regenerated, was by each man's considering the great work which was before him—in perfecting his own nature, in bringing himself to that perfection to which God had destined him. The meeting was afterwards addressed by Mr. Kennaway, Dr. Shapter, the Right Worshipful the Mayor, and Sir John Kennaway, Bart.

YEOVIL.—At a Committee Meeting of the Mutual Improvement Society, on Wednesday, the 7th instant, the thanks of the meeting were given to Mr. J. D. Williams, (one of the founders of the Institution, and who for a period of upwards of six years had acted as Honorary Secretary), for his past services, Mr. Williams having resigned the above office; the efficient discharge of the duties of which, had greatly promoted the interests of the Society. Mr. Charles Vining was elected Secretary, and Mr. Richard Manning, Assistant Secretary.

## TO CORRESPONDENTS.

*Chimney-sweeping Machine.*—"Can any of your readers inform me which Chimney-sweeping machine is esteemed the best, and where it is to be obtained?—A. T."

*Lectures.*—It is particularly requested that the Secretaries of Institutions will have the goodness to forward to the Secretary of the Society of Arts, as early as possible, two copies of the Programme of the Course of Lectures to be delivered during the ensuing Session at their respective Institutions.

## MISCELLANEA.

LIVERPOOL PUBLIC LIBRARY.—At a Meeting of the Liverpool Town Council, on Wednesday, the Mayor (Samuel Holme, Esq.), stated that William Brown, Esq., M.P. for South Lancashire, had offered to present the town with a sum of 6,000*l.* for the erection of a building for a public library.

INDUSTRIAL EDUCATION.—The September number of the *Dublin University Magazine*, writing on this subject, says, "We would by no means set up the foreign industrial institutions as models to be exactly followed. The scheme of instruction given at most of them is far too general to suit our own views. We would, in our industrial education, hardly have anything taught for which there already exists a complete machinery of instruction elsewhere. All languages and general literature, and all pure mathematics and theoretical science, whether physical or metaphysical, should be excluded from our course of instruction. We would require a certain elementary amount of these to be already possessed by the pupils before they entered on a course of industrial education, and we would have every facility afforded for their going on with these branches of education elsewhere, while they were receiving practical instruction in the industrial schools. The object of our industrial institutions should not be to rival any existing educational establishments, but to add to them a kind of instruction which they do not give. As to those branches of physical science which are already taught in our existing educational establishments, such as chemistry, geology, and mechanics; while we would, by all means, urge their being continued to be taught there as parts of general science, and portions of that mass of information necessary for a liberal education, they should, in our industrial schools, be the main objects of instruction, and taught not simply as sciences desirable to be known, but as useful to be practised. These and other kindred sciences should be taught in all their entirety, and followed into all their branches; their elements and principles should be drilled into the pupils' minds as the very A B C of their education; and every one of their possible practical applications should, as far as possible, be carried out under the pupil's eye, and, when possible, by his own hands."

NEW STEAM-SHIP.—Messrs. Scott Russell, and Co. have the contract to build for the Eastern Steam Navigation Company the largest ship ever heard of in the world, which is to carry sufficient fuel for the entire voyage to and from India or Australia. Her length is to be 680 feet; breadth, 83 feet; depth, 58 feet, with screw and paddle engines of aggregate nominal horse-power of 2,600. In addition to taking from 4,000 to 6,000 tons of coals, she will be able to carry 5,000 tons measurement of merchandise, and will have 500 cabins for passengers of the highest class, with ample space for poops and lower class passengers. The whole of her bottom, and up to six feet above the waterline will be double and of a cellular construction, so that any external injury will not affect the tightness or safety of the ship. The upper deck will also be strengthened on the same principle, so that the ship will be a complete beam, similar to the tube of the Britannia bridge. It will be divided into 10 separate water-tight compartments. She will have separate sets of engines, each with several cylinders; and separate boilers will be applied to work the screw, distinct from those working the paddle-wheels, so that, in the event of temporary or even permanent derangement of any one of the engines, or of either the paddle-wheels or the screw, the other engines and propellers would still be available. It is computed that her great length will enable her to pass through the water at the velocity of 15 knots an hour, and by the great speed, combined with the absence of stoppages for coaling, the voyage between England and India, *viâ* the Cape, may be accomplished in 30 or 33 days, and between England and Australia in 33 or 36 days. It is said that the ship will become, by its construction, a beam of sufficient strength to meet any strain to which it can be subjected, and will consist of so many distinct compartments that no local injury, however serious, will affect its buoyancy to any dangerous extent.

MR. TITUS SALT'S MILL, BRADFORD. — It will, doubtless, be remembered by many of the members of this Society, that during the year 1852, a drawing was exhibited of a mill then in course of erection for Mr. Titus Salt, of Bradford. On Tuesday last, the opening of the mill was celebrated. The event excited great interest in the West Riding, the undertaking being one of unusual magnitude—the amount of money embarked in the undertaking being something like a quarter of a million. The works, which consist of a mill, combing and weaving sheds, warehouses, &c., are upon the best construction, and are intended for the carrying on of the manufacture of alpaca and mohair fabrics upon a most extensive scale. The engines put down are nominally of 400 horse-power, but may be worked so as to be equal to 1,200 horse-power; the shafting for putting the machinery into motion is nearly two miles in length. The weaving shed will contain 1,200 looms, capable of weaving 30,000 yards of alpaca or mixed cloth fabrics per day, or nearly eighteen miles in length, or 5,616 miles per annum. The area appropriated to the buildings is computed at six acres, while the several floors in the mills, warehouses, and sheds, form a superficies of 55,600 yards, or 11½ acres. The mill, which runs from east to west, is 550 feet in length. It includes six stories, and is constructed of massive stone-work in the boldest style of Italian architecture. The floors are formed on arches of hollow brick, made on the ground by Clayton's patent process; the openings in the bricks being used for the purposes of ventilation. Rows of ornamental cast-iron columns and massive cast-iron beams support the arches. The roof is of iron. The windows, of large size, are filled with immense squares of cast plate-glass. The whole of the building is fire-proof.

LIQUID INDIA-RUBBER.—A correspondent of a New York paper, writing from Para, in Brazil says: "There is a method in preparing the gum, which has recently been patented, and which differs essentially from the usual curdling. The milk, as drawn from the tree, is bottled in large glass bottles and demijohns; a preparation of some chemical nature, which is a secret, is mixed with the milk, and the bottles are securely sealed. In this way the gum is sent to the United States. It curdles twenty-four hours after exposure to the air, and forms a pure, white, solid, and remarkably strong rubber. There is only one house in Para which has the secret of this receipt, as I learn, and a member of the firm gives his personal attention to the preparation of the article, some thousand miles in the interior of the country. The proprietors of the patent—as they say in Para—have a contract from an American manufacturer to take all they can furnish at 1 dol. 50 c. per pound, and he uses it all up in making suspenders, garters, &c. The ordinary rubber is gathered by Indians in the dry season, and is exchanged by them for the common whiskey of the country, and quite a pleasant beverage, cloths, and implements for extracting the milk. The merchants at Para buy it from second and third hands in preference to extracting it themselves, as they find that the Indians work better when hunting on their own account than when operating for employment."

LICHENS AS A PROTECTION TO BUILDINGS. — The Commissioners of 1839 for selecting stone for the New Houses of Parliament, referred in their report to a point which ought, perhaps, to be kept in view when comparing buildings—namely, an advantage which buildings in this country appear to possess over those in populous and smoky towns, owing to the lichens with which they become covered in such situations, and which, when firmly established over their entire surface, seem to exercise a protective influence against the causes of decomposition. As an instance of the difference in degree of durability in the same material subjected to the effects of the atmosphere in town and country, they point to the frustra of columns and other blocks of stone quarried at the time of the erection of St. Paul's Cathedral, and now lying in the island of Portland. These are covered with lichens, and though they have been exposed to all the vicissitudes of a marine atmosphere for more than 150 years, exhibit their original form even to the marks of the chisel; "while the stone which was taken from the same quarries (selected, no doubt, with equal, if not greater, care than the blocks alluded to), and placed in the cathedral itself, is, in those parts which are exposed to the south and south-west winds, found in some instances to be fast mouldering away." This, perhaps, was not altogether to be expected; because it might have been argued, that as the lichens were calculated to retain a certain amount of moisture on the surface of the stone, a contrary effect would result from their presence.—*The Builder*.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

### *From Gazette*, 16*th September*, 1853.

*Dated 26th March*, 1853.

727. A. Prince, 4, Trafalgar-square—Carriages. (A communication.)

*Dated 9th August.*

1855. W. Baines, Coverdale-terrace, Birmingham—Railways.

*Dated 12th August.*

1889. T. Allan, Adelphi-terrace—Electric conductors and insulation.

*Dated 15th August.*

1907. J. L. Talabot, 57, Chaussée d'Antin, Paris, and J. D. M. Stirling, The Larches, near Birmingham—Cast steel.

*Dated 25th August.*

1978. J. Shaw and J. Steinthal, Manchester—Artificial manure.

*Dated 1st September.*

2026. J. Macintosh, 12, Pall-mall—Breakwater.
2027. R. Oxland, Plymouth—Manure.

*Dated 2nd September.*

2028. J. Hinks, G. Wells, and F. Dowler, Birmingham—Machinery for metallic pens.
2029. J. Taylor, Manchester, J. Griffiths, Wolverhampton, and T. Lees, Stockport—Steam-boilers.
2030. B. Auric, 16, Castle-street, Holborn—Application of sulphate of lime to mosaics, and process of colouring the same.
2031. J. P Pritchett, jun., York—Window-sashes and shutters.
2032. Dr. A. Carosio, Connaught-square — Power by electric currents.
2033. J. and T. Sibley, Ashton-under-Lyne — Machinery for cutting discs out of metal and other plates.

*Dated 3rd September.*

2034. W. Ashton, Manchester, and W. B. Harvey, Salford—Machinery for braid.
2035. J. T. Jewiss and D. Jewiss, Horsleydown—Furnaces.
2036. E. Dobell, Hastings—Clocks and timekeepers.
2037. T. Walker, Birmingham—Rotary engines by steam, &c.
2038. A. Nagles, Ghent—Machinery for washing, bleaching, &c.
2039. G. Stickney, Hanover-street, Pimlico—A blower. (A communication.)
2040. G. Stickney, Hanover street, Pimlico — Machinery for forging metals. (A communication.)

*Dated 5th September.*

2041. J. Doyle, 17, Cambridge-street, Paddington — Waterproofing boots and shoes.
2043. J. Smalley, Bishopgate, Wigan, and W. Smirk, Ince, Wigan—Railway carriage-axles.
2044. J. H. Johnson, 47, Lincoln's-inn Fields—Stays. (A communication.)
2045. W. E. Newton, 66, Chancery-lane—Machinery for terry fabrics. (A communication.)
2040. W. E. Newton, 66, Chancery-lane—Breach-loading guns. (A communication.)

*Dated 6th September.*

2047. T. B. Upfill and W. Brown, Birmingham—Metallic bedsteads, &c.
2048. L. W. Wright, Charlford, Gloucester—Reaping-machines.
2049. A. Calles, Southwark-square — Manufacture of typographic characters.
2050. J. Kerfoot, Lower Darwen, Lancashire—Spinning machinery.
2051. H. Wilkinson, Brass-foundry, Tottenham-mews — Air furnaces.
2052. J. Davis and R. Ramsay, Low Furness Iron-works, Ulverstone—Steam, air, and water engine.
2053. T. Pope and E. Bufton, Birmingham — "Buffalo buttons."

*Dated 7th September.*

2055. J. Smith and A. Somerville, Birmingham—Metallic pens and holders.
2056. J. Alsop, Huddersfield, and E. Fairburn, Kirklees-mills, Mirfield, Yorkshire—Baking bread.
2057. J. G. Fletcher and W. Peel, Accrington—Looms.
2058. D. Law and J. Inglis, Glasgow—Moulding and shaping metals.
2059. W. J. Smith, Stretford, Lancashire—Buttons.
2060. W. Grimshaw and Ellis Rowland Morsley, Antrim—Bricks.
2061. G. E. Ashton, Middlesex—Converting refuse materials into yarn, &c.
2062. B. Hustwayte, Hockley-street, Homerton, and R. J. P. Gibson, Upper Brunswick-street, Hackney — Composition for bricks, tiles, &c.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 12th September*, 1853.

625. Nicolas Auguste Eugene Millon and Leopold Mouren, of Algiers—Improvements in the treatment of corn and other grains, and more especially in all that concerns washing, drying, grinding, curing, and preserving them.

*Sealed 13th September.*

642. William Morgan, of Spencer-street, Shoreditch—Manufacture of a portable double-action folding chair.
665. Paul Cameron, of Glasgow—Improvements in marine and surveying compasses.
671. John Haskett, of Wigmore street — Improvements in grinding stones and whetstones. (A communication.)
682. Henry Bousquet, of Fenchurch-street—Improvements in the manufacture of manure.
706. John Henry Park and Joseph Park, of Preston — Improvements in water-closets.
782. Robert Evans Peterson, of Tottenham Court-road — Invention of an improved piston. (A communication.)
1692. Isaac Taylor, of Stanford Rivers, Essex—Improvements in machinery for printing.
1716. Moses Poole, of Avenue-road, Regent's-park—Improvements in gas regulators. (A communication.)
1718. James Shield Norton and Henry Jules Borie, of Union-works, New Park-street, Southwark—Improvements in the manufacture of tiles and stairs from plastic materials.
1730. Alexander Isaac Austen, of Trinity-place, Wandsworth-road — Improvements in the apparatus used in the manufacture of mould candles.
1734. Mary Ann Rylands, of Kingston-upon-Hull—Improvements in yards and spars of ships and other vessels. (A communication.)
1752. Alfred Vincent Newton, of Chancery-lane — Improved manufacture of cutting-tools. (A communication.)
1760. Joseph Barrans, of Peckham-lane, Deptford—Improvements in steam-boilers.
1762. Lansing E. Hopkins, of New York—Manufacture of hat-bodies of fur and other like substances.

*Sealed 17th September.*

673. Charles Harratt, of Royal Exchange-buildings—Improvements in strengthening the masts of ships and vessels.
687. James Fraser, of Gracechurch-street—Improvements in the manufacture of portable packages.

# SOCIETY OF ARTS.

## FRIDAY, SEPTEMBER 30th, 1853.

## ON CHINESE HOROLOGY, WITH SUGGESTIONS ON THE FORM OF CLOCKS ADAPTED FOR THE CHINESE MARKET.

BY D. I. MACGOWAN, M.D., OF NINGPO, CHINA.

The American Patent-office, as our readers are perhaps aware, does not confine its duties to the mere business of granting patents, but in addition endeavours to collect information on the subject of inventions and industrial progress in every part of the world. For this purpose, the American Consuls in each of their districts are charged with the duty of reporting to the authorities at home everything that may be calculated to be useful to home industry. The following is taken from a report of this kind, and as the subject is one which is equally important to our own countrymen in a manufacturing point of view, it has been thought desirable to print the greater portion of it, believing that it will be found useful as a guide to those connected with the trade, as well as interesting to the general reader. The report, after stating the circumstances under which it is made, proceeds as follows:

In a manufacturing point of view, although there is much less to repay research, yet there are some branches of industry in this department the investigation of which could not fail to bring valuable facts to light; and if no more can be done than to point out defects in Chinese labour, which our artizans can supply, that alone would prove mutually advantageous to the two great nations on the opposite shores of the Pacific.

Clockmaking, which forms the subject of this note, is a case in point; and it is believed that, with a modification to be suggested, American clocks can be made an article of extensive import into China. For a long period the importation of clocks and watches, chiefly the former, into this country from the continent of Europe, was valued at little short of half a million of dollars annually. This trade has nearly ceased, partly owing, no doubt, to the rapid impoverishment by the opium traffic, and partly to the fact that native manufacturers are able to compete with foreigners. Yet clocks are not often met with in China; they are generally confined to the public offices, where it is common to find half a dozen all in a row. The number annually manufactured cannot be large, for in the richest cities in China clockmakers are not numerous. At Nankin there are 40 shops; at Suchau, 30; Hangchau, 17; and at Ningpo, 7; the average number of men employed in each being less than four, who are mostly occupied in repairing watches and clocks. The cheapest clock they make costs 7 dollars: some are worth as much as 100 dollars, the most common price being about 25 dollars each. A manufacturer estimates the number of clocks made at the above prices at 1,000 per annum; and probably 500 more would more than cover the whole annual manufacture of the empire. A few watches are made, the chain and spring being the only parts that are imported. The oil used by Chinese workmen to abate friction appears to be particularly adapted for that purpose, though expensive; it is obtained from the flowers of the *Olea fragrans*.

Before describing the kind of clock which seems adapted for this market, a brief glance at the history of the horological art in China may not be inappropriate. It had its rise, as in the western side of Asia, in the clepsydra.

Assuming—what is in the highest degree probable—the authenticity and accuracy of the Shuking, we find that, forty-five centuries[*] ago, the Chinese had occupied themselves with the construction of astronomical instruments somewhat similar to the quadrant and armillary sphere, and the observations they made with them, even at that remote period, are remarkable for their accuracy, enabling them to form an useful calendar. The present cycle of sixty was adopted at that time by Hwangti (2697—2957 B.C.) To this emperor is attributed the invention of the clepsydra. The instrument at that period was probably very rude, and not used as a timepiece, but for astronomical purposes, in the same manner as employed by Tycho Brahe, for measuring the motion of stars, and subsequently by Dudber in making maritime observations. It was committed to the care of an officer of rank, styled, Clepsydra Adjustor.

The greatest philosopher in Chinese history anterior to Confucius was Duke Chau, the alleged inventor of the compass. He appears, also, to have been the first to employ the clepsydra as a timepiece. He divided the floating index into one hundred equal parts or "kih." In winter, forty kih were allotted to the day and sixty to the night, and in summer this was reversed. Spring and autumn were equally divided. This instrument was provided with forty-eight indices, two for each of the twenty-four terms of the year. They were consequently changed semi-monthly—one index being employed for the day, and another for the night. Two were employed every day, probably, to remedy in a measure the obvious defects of all clepsydras—of varying in the speed of their rise or fall, according to the ever-varying quantity of water in the vessel, which might be done by having the indices differently divided. To keep the water from freezing in winter, the instrument was connected with a furnace, and surrounded by heated water. Chau flourished eleven centuries before our era. The forms of the apparatus have been various, but they generally consisted of an upper and a lower vessel, always of copper, the former having an aperture in the bottom, through which water percolated into the latter, where floated an index, the gradual rise of which indicated successive periods of time. In some this was reversed, the float being made to mark time by its fall. A portable one was occasionally employed in ancient times, on horseback, in military tactics. Instruments constructed on the same principles with the above were in use among the Chaldeans and Egyptians at an early period—that of Ctesibius, of Alexandria, being an improvement over those of more ancient times. The invention of Western Asia was doubtless wholly independent of that of the East, both being the result of similar wants. Clepsydras were subsequently formed of a succession of vessels communicating by tubes passing through dragons, birds, &c., which were rendered still more ornamental by the indices being held in the hands of genii.[†]

The earliest application of motion to the clepsydra appears to have been in the reign of Shuenti (126—145 A.D.), by Tsianghuug, who constructed a sort of orrery representing the apparent motion of the heavenly bodies around the earth, which was kept in motion by dropping water. There is reference, also, to an instrument of this description in the third century. In the sixth century, an instrument was in use which indicated the course of time by the weight of water, as it gradually came from the beak of a bird, and was received into a vessel on a balance, every pound representing a kih. About this time mercury began to be employed instead of water, which rendered the aid of heat in winter unnecessary. Changes were made, also, in the relative number of kih for day and night, so as to vary with the seasons.

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[*] Chronology.—Although doubts may exist respecting the absolute accuracy of Chinese chronology, it must nevertheless be admitted that it is so far correct as to render arguments founded on the commonly received chronology altogether untenable; and it is a matter of regret, therefore, that the latter has been followed, in their Chinese publications, by all Romish and Protestant missionaries. I cannot too earnestly urge the adoption of Hale's Chronology, and that speedily, lest in the mean time some Chinese Celsus or Porphyry should arise and bring objections against our faith not easily answered to the satisfaction of their countrymen.

[†] Drawings of two of the numerous forms of these instruments are given in the Report, taken from an old astronomical work.

As in Europe, monks of the Roman church devoted considerable attention to mechanical inventions, especially in the construction of instruments for measuring time for the regulation of their worship and vigils; in like manner, also, Buddhist monks in their silent retreats, but at an earlier period, similarly occupied themselves, and for the same purposes. Several instruments, designed as time-pieces, the invention of priests, are mentioned in Chinese history. They present nothing novel, however, with the exception of one, which is nothing more than a perforated copper vessel placed in a tube of water, which gradually filled and sunk every hour, requiring, of course, frequent attention. Although their knowledge of hydrodynamics has ever been very limited, the Chinese appear to have been the first to devise that form of clepsydra to which the term water-clock is alone properly applied; that is to say, composed of apparatus which rendered watching unnecessary, by striking the hours. Until the commencement of the eighth century, the persons employed to watch the clepsydra in palaces and public places, struck bells or drums every kih; but at this period a clock was constructed, consisting of four vessels, with machinery, which caused a drum to be struck by day, and a bell by night, to indicate the hours and watches. No description of the works of this interesting invention can be found. It is possible, however, that the Saracens may have anticipated them in this invention of water clocks.

In the history of the Tong dynasty (620-907), it is stated that in the Fahlin country (which in this instance doubtless means Persia, though the best living authority amongst the Chinese makes it Judea), there was a clepsydra on a terrace near the palace, formed of a balance, which contained twelve metallic or golden balls, one of which fell every hour on a bell, and thus struck the hours correctly. It is not improbable that this instrument is identical with the celebrated one which the king of Persia sent in 807 to Charlemagne.

In 908 an astronomer, named Tsiang, made an improvement on all former instruments, and which, considering the period, was a remarkable specimen of art. The machine, which was in a sort of miniature terrace, was ten feet high, divided into three stories, the work being in the middle. Twelve images of men, one for every hour, appeared in turn before an opening in the terrace; another set of automata struck the twelve hours, and the kih, or eighths of such hours. These figures occupied the lower story; the upper story was devoted to astronomy, where there was an orrery in motion, which it is obvious must have rendered complex machinery necessary. We are only told that it had oblique, perpendicular, and horizontal wheels, and that it was kept in motion by falling water.

As the Saracens had reached China by sea at the close of the eighth century, and by land at an earlier period, some assistance may have been derived from them in the construction of this instrument, but I am disposed to consider it wholly Chinese. Beckman, after much learned research, ascribes the invention of clocks to the Saracens, and the first appearance of these instruments in Europe to the eleventh century. Mention may here be made of other instruments of the same description, also constructed about this period. One (which, like the last, united an orrery and clepsydra) was formed in one part like a water-lily, whilst in another were images of a dragon, a tiger, a bird, and a tortoise, which struck the kih on a drum, and a dozen gods, which struck the hours on a bell, with various other motions, besides a representation of the revolution of the heavenly bodies. The machinery of another of these was moved by an under shot water-wheel; its axis was even with the ground, and consequently the frame containing it was partly below the surface. The motions of the sun and moon, stars and planets, were made to revolve around a figure of the earth, represented as a plain from east to west. Images of men struck the hour, and its parts. In this, however, as in all the aforenamed instruments, the sounds struck were always doubtless the same, as the Chinese do not count their hours. Another machine was constructed, which also represented the motions of the heavenly bodies. It was a huge, hollow globe, containing lights, and perforated on its surface, so as to afford in the dark a good representation of the heavens. This also was set in motion by falling water. Subsequently to this, various machines are mentioned; but the brief notices given afford nothing of interest until we approach the close of the Yuen dynasty, the middle of the fourteenth century. Shungtsing, the last of the race of the great Genghis Khan (who is depicted in history as an effeminate prince, and as having the physiognomy of a monkey), was evidently a man of great mechanical skill; and to the last, when his dominions were slipping from him and confusion reigned everywhere, he amused himself by making models of vessels, automata, and time-pieces. His chief work was a machine, contained in a box seven feet high and half that in width, on the top of which were three small temples. The middle of these temples had fairies holding hororary characters, one of whom made her appearance every hour. Time was struck by a couple of gods, and it is said they kept it very accurately. In the side temples were representations of the sun and moon respectively, and from these places gods issued, crossing a bridge to the middle temple, and after ascertaining as it were the time of day from the fairies, returning again to their quarters. The motions in this case were, it is thought, effected by springs. An instrument somewhat similar is described as an ornament in the palace of the capital of Corea. It was a clepsydra with springs, representing the motions of the celestial orbs, and having automata to strike the hour. Since the introduction of European clocks, clepsydras have fallen into disuse. The only one, perhaps, in the empire is that in the watch-tower of the city of Canton. It is of the simplest form, having no movements of any kind but it is said to keep accurate time.

In dialling, the Chinese have never accomplished anything, being deficient in the requisite knowledge of astronomy and mathematics. It is true, the projection of the shadow of the gnomon was carefully observed in the earliest historic period; but this was for astronomical purposes only.* Proper sun-dials were unquestionably derived from the West, but they were not introduced, as Sir J. F. Davis supposes, by the Jesuits. The Chinese are probably indebted to the Mahomedans for this instrument; although we find an astronomer endeavouring to rectify the clepsydra, by means of the sun's shadow projected by a gnomon, about a century earlier than the Hegira. There is a sun-dial, in the Imperial Observatory at Pekin, above four feet in diameter. Smaller ones are sometimes met with in public offices. These were all made under the direction of missionaries of the Roman church, or their pupils. From remote antiquity, a family named Wang, residing at Hiuning, north latitude, 29° 53′, longitude E. G. 118° 17′, in the province of Canhwui, has had the exclusive manufacture of pocket compasses, with which sun-dials are often connected. In most of these, a thread, attached to the lid of the instrument, serves as a gnomon, without any adaptation for different latitudes, although they are in use in every part of the empire. Another form, rather less rude, is employed by clockmakers for adjusting their time-pieces; it is marked with notches, one for each month in the year, to give the gnomon a different angle every month. The Chinese instrument exceeds that of Corea in every respect.

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* It was by a gnomon that the ancient Chinese endeavoured to ascertain the centre of the earth. A measurement of the length of the solstitial shadow, made at Loyang, on the Ye River, 1,200 B.C., was found by Laplace (quoted by Humboldt in "Cosmos," vol. ii., p. 115) to accord perfectly with theory of the obliquity of the ecliptic, which was only established at the close of the last century.

Time is not unfrequently kept by igniting sticks, the combustion of which proceeds so slowly and regularly as to answer for temporary use tolerably well.

Hour-glasses are scarcely known in China, and only mentioned in dictionaries as instruments employed in western countries to measure time. A native writer on antiquities, says: "The Western priest, Limatau (M. Ricci), made a clock which rendered and struck time a whole year without error." The clock brought out by Ricci, if not the first seen in China, is the earliest of which mention is made in Chinese history. They subsequently became an article of import; and, as already mentioned, this branch of trade was at one time of considerable value. Clocks and watches of very antique appearance are often met with—specimens of the original models, scarcely to be found in any other country. Some of the latter, by their clumsy figure, remind one of their ancient name, "Nuremberg eggs;" but their workmanship must have been superior to that of most modern ones, or they would not be found in operation at this late day.

The Chinese must have commenced clockmaking at an early period, as none now engaged in the trade can tell when or where it originated; nor can it be easily ascertained whether their imitative powers alone enabled them to engage in such an undertaking, or whether they are indebted to the Jesuits for what skill they possess. It is certain, the disciples of Loyola had for a long time, and until quite recently, in their corps at Pekin, some who were machinists and watch-makers. One of these horologists complains, in "Les Lettres Edifiantes et Curieuses," that his time was so occupied with the watches of the grandees, that he had never been able to study the language. Doubtless, the fashion which Chinese gentlemen have of carrying a couple of watches, which they are anxious should always harmonise, gave the fathers constant employment. A retired statesman of this province has published a very good account of clocks and watches, accompanied with drawings representing their internal structure in a manner sufficiently intelligible.

The Chinese divide the day into twelve parts, which are not numbered, but designated by characters, termed, rather inaptly, horary. These terms were originally employed in forming the nomenclature of the sexagenary cycle (2657 B.C.), which is still in use. It was not until a much later period that the duodecimal division of the civil day came into use, when terms to express them were borrowed from the ancient calendar. The same characters are also applied to the months. The first in the list (meaning son) is employed at the commencement of every cycle, and to the first of every period of twelve years; and also to the commencement of the civil day at 11 P.M., comprising the period between this and 1 A.M. The month which is designated by this term is not the first of the Chinese year, but singularly enough it coincides with January. Each of the twelve hours is divided into eight kih, corresponding to quarter hours. This diurnal division of time does not appear to have been in use in the time of Confucius, as mention is made in the spring and autumn annals of the ten hours of the day, which accords with the decimal divisions so long employed in clepsydras, the indices of which were formerly divided into one hundred parts. A commentator of the third century of our era, in explaining the passage relating to the ten hours, adds a couple more; but even at that time the present horary characters were not employed.

The form* I would recommend as suitable for the dial-plates of clocks manufactured for this market is as follows: An outer circle, with small characters as numerals, exactly corresponding to the Roman figures on western clocks; an inner circle, containing the twelve horary characters, and within these the signs for noon, evening, midnight, and dawn. In the horary circle large single characters should be placed, to represent whole hours, and small double ones half hours, equal to a whole European hour.

Let the minute hand extend to the inner part of the outer circle, and make twelve revolutions in a diurnal period. The hour hand should reach to the inner edge of the horary characters, and make one revolution in the same period of time. Let the pendulum vibrate seconds as now, and the minute hand, at the expiration of sixty seconds, make half a revolution. It should strike from 1 to 12 A.M. and P.M., and correspond in this respect to European clocks. It will be understood, then, that at our even hours the short hand will point to a large horary character—the middle of a Chinese hour—and the long hand will be directly upward; and at our odd hours the former will be opposite the small characters which point the commencement of their hour, and the latter will point directly downward, or at the 12 P.M. of our clocks. Or to repeat the same in another manner: At 1 o'clock P.M., our reckoning, the hour hand will be half-way between the large characters on the top and the next one to the right; and the minute hand, having made half a revolution, will point perpendicularly downwards, and the clock strike one. At the expiration of another of our hours, a whole Chinese hour will have expired when the former hand will have reached the first large character to the right, and the latter be directed to the zenith, the clock striking two.

After this perhaps unnecessary minute description of what is wanted in the machinery, a few words remain to be added respecting the instrument as a whole. In the first place, it should be well made. A few worthless ones would damage the business irreparably. They should be brass, and placed in frames of wood, which will not be easily affected by atmospheric changes. Common pine-wood, veneered with mahogany, have answered well. Spring clocks will not succeed. Some of this description, sent from New York, cannot be kept in repair; whilst a quantity of clocks, moved by weights, manufactured chiefly in Connecticut, imported into China about seven years ago, have proved good time-pieces, and give no trouble. With regard to external appearance, on which so much depends, I would advise that in every case there be as much of the works exposed as possible, through an opening in the dial-plate. A Chinaman not only wishes to see what he is buying, but what is going on in his instruments when bought; and, as his countrymen have the merit of being extreme utilitarians, mirrors in the lower part of the door will be generally preferred to any other ornament. Some, however, should be ornamented at this point, for the sake of variety; and perhaps nothing would please more than such a grouping of objects by the artist as would represent a river, bringing into view a steamboat and a sloop, and on the banks a railroad, locomotive, and cars, a steepled church, or a many-storied hotel in the distance, and a stage-coach also. Or another interesting device would be afforded by a representation of the solar system, but this would need to be accompanied with several Chinese characters.

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* A diagram is given in the original, which may be seen at the Society's House, on application to the Secretary.

It is of primary importance that a particular description of the manner of using the clock, the mode of putting it up, setting it off, winding up, and regulating, should be given. These directions, which should be more minute than if designed for English readers, can be translated and printed very easily in this country. But there would be no difficulty in printing the directions by means of wooden blocks in the manufactory at home. In copying the characters for the dial, extreme care is requisite that every stroke and each line should be represented exactly as given in the diagram. Astronomical characters or descriptions of any kind which may be needed by individuals trying the experiment of clock-making for China, I shall furnish most cheerfully, for the privilege of increasing the utility of the instrument, by introducing with them a few passages of sacred Scripture.

It may be asked, why, if such a clock be needed by the Chinese, they have never constructed one for themselves? It is certainly marvellous that they should manufacture clocks, including dial-plates, and always employ Roman figures, and follow the reckonings of foreigners, which so few of them are able to comprehend, and which by all are considered mysterious and outlandish. It is only to be accounted for on the ground of their limited inventive abilities, and high powers of imitation. That a time-piece of this description would be in demand in China, I am perfectly satisfied from inquiries made of natives in various quarters. Chinese merchants say that they should be retailed at about five or six dollars each. If I recollect rightly, they can be made in Connecticut at 2 dolls. 50 cents, which would afford sufficient profit both for the mechanics and merchant.

## REMARKS BY COL. CHESNEY, R.A., ON THE TUBULAR OR DOUBLE LIFE-BOAT, INVENTED BY H. RICHARDSON, ESQ., OF ABER-HIRNANT.*

*Communicated through the Secretary of the Royal Geographical Society.*

It seems strange that the use of life-boats in Great Britain should appear to be of so recent a date, for as far as I have been able to ascertain, the first patent was granted to Mr. Lukin, in 1785, for one which had a projecting gunwale, hollow cases, or double sides, and air-tight lockers or inclosures under the thwarts to secure buoyancy.

As this boat was liable to be disabled by having the sides stove in, a committee of gentlemen at South Shields offered a reward in 1788 for a more perfect model, and one that may be considered the parent life-boat, was produced in consequence by Mr. Greathead, in 1789, which was floated in 1790. A curved bottom, like the section of a wooden bowl, was chosen for the boat, under the belief that she could *scarcely* upset, and that she could not remain bottom upwards if she did so. A craft was thus constructed of 30 feet in length, 10 feet beam, and 3 feet 4 inches in depth. She was lined with cork throughout, and rowed 10 oars, double banked, and was steered by an oar at each extremity. Thirty-one boats were built of this construction, and it is stated that up to 1804 nearly 300 persons were saved by their means.

In the year 1800 several contrivances with reference to the conversion of ships' boats into life-boats were brought forward by the Rev. Mr. Bremmer, Minister of Walls and Flota, Orkney. The plan which proved the most successful, and for which a medal was given, was the securing a cask in the bow of the boat upon a bed of cork, with another similarly attached to the stern, and thus producing the necessary buoyancy. An improvement on the preceding was brought forward by Wilson, of London, in 1807. His boat was a modification of that of Mr. Lukin, the projecting gunwales in his case being divided into separate compartments, so that if one of them should be beaten in by striking against a rock, the others might still remain serviceable.

Water-tight boxes were next suggested by Browne in 1817, and about this period a decided advance was made by the late Ralph Watson, Esq., of the Treasury, who proposed the use of a number of copper tubes, which being placed along the deck beams of any vessel, would secure a life-raft even when the wreck was taken to pieces.

In 1824, a steam life-boat was prepared by Sir William Hillowey, Bart., the hull of which was to be filled with cork, and the boilers protected by the same means from an influx of water.

In 1829, Lieutenant Ansell recommended the use of bags of well-tanned sheepskin, which were to be kept in store and inflated for use when required, to give buoyancy to any boat that might need additional power; but a much more efficient system was in 1837 given to the world by Captain Rorie, namely, an array of copper tubes or joints of bamboo, to be placed like those of Mr. Watson under the seats of life-boats, so as to render them safe and serviceable in cases of shipwreck. But it does not appear that this plan was ever brought into general use, and the state of our life-boat system has remained lamentably defective.

To give impulse to invention, and with the noble design of preventing disaster, His Grace the Duke of Northumberland offered a prize for a life-boat which would fulfil certain conditions — those of self-righting and freeing herself of water, being considered of the greatest importance. The liberality of His Grace produced 360 models of boats, 50 of which were selected by the Admiralty Life-boat Committee as being worthy of a place in the Great Exhibition.

Without attempting to describe these numerous specimens, it may be mentioned that one is the tubular, which will presently be noticed; the other was invented by Mr. Harbord, of Hull, with the specific objects of self-righting and freeing herself from water, and was constructed of copper. Her length was to be 20 feet, keel 10 feet, depth 4½ feet, sheer of gunwale, 24 inches, and weight 19½ cwt., to row ten oars. But the prize was awarded to Mr. James Beeching, of Yarmouth, for a boat nearly the form of a whale-boat, 36 feet long, 9½ beam, depth

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* This communication has been slightly abridged.—*Ed.*

3½ feet, sheer of gunwale 36 inches, pulls 12 oars, and has for ballast a water-tank divided into compartments. A thick cork fender is placed outside, and extra buoyancy is secured by means of air-cases placed high in the bottom of the boat. It was supposed that this build possessed the cardinal qualifications of self-righting when capsized; but three disastrous occurrences—namely, at Lytham, Caernarvon, and Rhyl, have unfortunately proved the contrary; on one occasion eight, and on another six, persons having perished.

These calamities are merely mentioned, in order to show that no safe life-boat has as yet been adopted; and notwithstanding the liberal example of the Duke of Northumberland, it is to be feared that while the great necessity for efficient life-boats has become more and more apparent of late years, the spirit of encouragement has rather declined.

Soon after Mr. Greathead's life-boat was beginning to do some good service in the cause of humanity, a reward of 1,200*l*. was voted to him by Parliament in 1802; the Literary and Philosophical Society bestowed a reward on him at the same time; and the Royal Humane Society gave him their medallion. Nor was this all: the Corporation of the Trinity House awarded him 100 guineas; the Society of Arts their Gold Medallion and 50 guineas; and Lloyd's 100 guineas; and this body at the same time offered 2,000 guineas for the construction and establishment along the coast of suitable life-boats, and this in sufficient numbers, which, as we are all aware, is a desideratum still to be accomplished; for, so far from any efficient plan having been carried out, we find, from a statement of Capt. Washington, that in 1,500 miles of the Scottish coasts, there are only eight life-boats established, and that only seventy five are provided for 2,000 miles of the English coast, whilst eight life-boats are all that belong to Ireland. In bringing this lamentable deficiency before the public as well as the Government, Capt. Washington shows us, at the same time, that during the year 1850 there were 680 shipwrecks on the coast of Great Britain, and that 780 lives were lost. But, numerous as were these calamities at that period, they have greatly increased since 1850; for it appears from a recent calculation that 800 seamen perished on the east coast of England during the last calamitous winter, and an aggregate of 2,000 British seamen on our coasts elsewhere.

Hitherto, public bodies, such as the Trinity Board, the National Institution for the Preservation of Life from Shipwreck, the Shipwrecked Fishermen and Mariners' Royal Benevolent Society, have acted, and continue to act, separately in the good cause; but it is not going too far to express the belief that one centralised system would be more advantageous than the whole of these desultory efforts; and that all the power of the Government is desirable, and even necessary, in order to work out more efficiently a general plan (with, as a necessary part, more ample means) for the preservation of life from shipwreck. And since every British seaman contributes something annually (3*d*. a year) from his limited earnings for this purpose, he has a right to expect that the funds so raised should be turned to the best account.

The momentous question of efficient life-boats can only be safely dealt with after the most patient consideration, founded upon an extensive series of experiments, both as regards the construction of the boats to be adopted, and the encouragement to be given to their crews. As regards the latter, it may be here observed that the salvage is a reward to those who save a part of a ship's cargo; but if the chance of the latter be overlooked, in order to save life, there is no pecuniary reward for individuals who make this sacrifice.

I will now draw attention to the peculiar form of the boat, which dates from the year 1830, when a wreck at Weymouth, and the previous examination of Blanchard's pontoons, gave rise to the invention of the tubular life-boat, by Henry Richardson, Esq., of Aber-Hirnant, Merioneth, which has already successfully encountered the sea in almost every form. I need scarcely observe that Blanchard's pontoons are divided, both longitudinally and transversely, into several compartments, by partitions of tin, both to increase their strength, and to prevent them from being accidentally perforated in any part. Tubular boats are by no means modern: we have the flying praam of Anson, the outrigger or mosquito boats of the Cingalese and Malays, and others, seen by myself in Nubia, are built upon the same principle; and if water-tight compartments do not belong to Noah's ark itself, they have been actually in use for ages in the Chinese boats, and also in Europe in various ways. But, although the invention of the tube and water-tight compartment neither is, nor could be, claimed in this instance, the adaptation of them to the construction of a life-boat, is due to Mr. Richardson, and is a very important practical step toward the object we are so desirous of attaining. The first boat of this kind was built, as I have before said, in 1830; in 1831 three others were constructed, the largest to row 12 oars, and one so small that a child in petticoats was in the habit of rowing it alone at Weymouth, in the surf, in perfect safety. The subject dropped for years, until in 1850 Henry Thomas Richardson, Esq., then an officer in the 4th Dragoon Guards, and son of the above-named Mr. Richardson, caused a fifth to be built at Manchester.

When the Duke of Northumberland offered his prize, Mr. H. T. Richardson's model was one of those sent in; and although the prize was awarded to Mr. Beeching, so persuaded was he of the superiority of the tubular plan, that he caused the original of the present boat to be built. The boat is formed of two tubes of tinned iron, 40 feet in length by 2½ in diameter, tapering at either end, and meeting each other, thus giving the appearance of sheer. An iron frame work, securely rivetted, unites the whole into one mass, and the tubes having longitudinal bars of iron and hoops within, and iron heels running from end to end, they are divided into water-tight compartments, occupied by air-proof bags: a cork fender surrounds the whole fabric. The rowers and passengers are placed on a platform above the frame-work, which is surrounded by a light gunwhale, the height of the rowlocks. A rope passes along under the kelson for the purpose of towing; sliding-keels are proposed to be added, to give increased stability; she carries two lug-sails, topsails, and jib; steers, rows, and sails well. This boat was launched on the 15th January, 1852, but had scarcely been 24 hours on the Cheshire shore, when she was found to be wilfully damaged by having had holes driven into the different compartments of her tubes. After repair, she was submitted to the most trying experiments that could be devised. These were, landing her passengers and crew in a gale on a lee shore, and going off again; towing, in stormy weather, behind a steamer, without any one on board, the commander of the steamer having a *carte blanche* to upset, swamp, or tear her to pieces if he could. Having proved in all of them perfectly successful, Mr. H. T. Richardson circulated a challenge to the Shipwreck and other Societies, also to upwards of 50 life-boat stations on the coast of Britain; but *not a boat* came out to meet him. However, Mr. Beeching having expressed his readiness to meet her at Ramsgate with his prize life-boat, the tubular set sail, and, after a perilous voyage round the Land's-end, and encountering very severe weather on the way, reached that place on the 22nd of June, when they found, to their extreme surprise, that Mr. Beeching had disposed of his boat, and the *Challenger* remained unopposed the champion of the field.

On her voyage round from Liverpool to Woolwich, the tubular was at Plymouth subjected to various experiments in the presence of the Port Admiral Sir John Ommanney, alongside of the *Leander* frigate, as the following extracts from letters will show. These letters are from officers then serving in the *Leander*; their names are not given, as their permission has not yet been asked, though it is believed that they would have no objection:

> "I think *Challenger* the only thing built, at least that I have heard of, deserving the name of life-boat. That she has no capacity to retain water, that she cannot sink or capsize, was fully proved alongside the *Leander*, when eighty men on one tube only immersed it deeper without in any way affecting the safety of the boat or the people in her. From her having so ably fulfilled all the conditions of the challenge, and her capability in other respects, I would willingly take a boat of the same dimensions as one of our cutters or quarter life-boats at sea; and feel convinced many a valuable life would be saved had a ship such a boat belonging to her. She would also be of great service in landing in surfs, embarking troops or field pieces, and going up shallow rivers."
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> "Again," writes another individual, "I witnessed one of the *most severe trials* that possibly could have been put to any boat in the world, and she *behaved admirably* when tried alongside H.M.S. *Leander*, June 5th, 1852."

Hitherto it has been found to be impossible to capsize the tubular boat, because the force of the sea passes off and through the two tubes; but if she were to be upset by any cause, her buoyancy would be greater than before, and she would, with trifling modifications, be a serviceable boat, and row, as will be proved, bottom upwards.

It may be added, in conclusion, that Mr. Richardson has recently expressed to the Shipwreck and Mariner's Benevolent Society, also to the National Institution for the Preservation of Life from Shipwreck, his readiness to meet any of their boats for the purpose of a trial, at any time and place between the Land's-end and John O'Groat's House, on the west coast of Ireland, between Cape Clear and the Causeway, and there to prove practically whether the tubular is or is not the best life-boat at present in use, as it would be the least expensive.

## NOTES ON TIN.

MR. LAYARD, in his work upon Nineveh and Babylon, in reference to the articles of bronze from Assyria, now in the British Museum, states, that the *tin* used in the composition was probably obtained from Phœnicia; and, consequently, that *that* used in the Assyrian bronze may actually have been *exported* nearly *three thousand* years ago from the British Isles. The Assyrians appear to have made an extensive use of this metal; and the degree of perfection which the making of bronze had then reached, clearly shows that they must have been long experienced in the use of it. They appear to have received what they used from the Phœnicians. It is said that the Phœnicians were indebted to the Tyrian Hercules for their trade in tin; and that this island owed to them its name of *Baratanae*, or Britain, the land of tin.

The Great Polgooth Tin Mine, in Cornwall, has been worked for tin from a period far too remote for the earliest record, and the histories of Cornwall have severally given it that notice to which it was entitled from its magnitude and importance. At least, from the time of the requirement of tin by the Phœnicians to the present, it has been wrought more or less, with short intermissions, and has yielded a greater quantity of ore than any other tin mine in the county of the same depth. In a geological point of view, it presents some of the most remarkable features known in the science of mining, and has not unfrequently baffled all the known theory and practice of the day; and from this reason mainly, whilst other mines have started into existence at a much more recent period, and have been profitably worked to a great depth; this mine has only yet reached to about 110 fathoms. The mine during the last sixty years has not been sunk one single fathom.

The following improvements in the processes of obtaining tin, have recently been published by Mr. F. W. Emerson, of the Trerciffe Chemical-works, Penzance.—The improvements consist in a means of purifying and separating the ore of tin from other metallic oxides, sulphurets, arseniates, tungstates, or other compounds, previously to its introduction into the smelting furnace, by digesting the ore (either with or without the aid of heat), in a mixture of common salt, sulphuric acid, and nitrate of soda or potash; the last of these not being absolutely necessary to the success of the operation, though it helps to shorten the time in which the process is performed. The inventor first makes a correct analysis of a fair sample drawn from the bulk of the ore to be operated upon, in order to ascertain the exact nature and amount of the impurities. In the event of its being found to contain any compound of sulphur or arsenic, he first roasts or calcines the ore by any of the ordinary known methods. This process is not necessary, unless such compounds are present. If it is found to contain oxide of tin—the ores of tin mostly occur as a peroxide—it will be necessary, in order to avoid loss, either first to peroxide it, or afterwards to precipitate from solution by the insertion of metallic zinc, or any other precipitating agent. To peroxidize the oxide of tin, he saturates the bulk of the ore to be operated upon with nitric or nitrous acid, and after allowing it to stand for two or three hours, to permit a full reaction to take place, he puts it into an iron, fire-clay, or other convenient retort, and distils or evaporates it to dryness, receiving the nitric or nitrous acid gases in stoneware or other convenient condensers, to be used over again. He then mixes the ore with such a quantity of common salt, as by decomposition with sulphuric acid shall yield a sufficient amount of muriatic acid to combine with the contained impurities of metallic oxides, or bring the oxides of iron and manganese in wolfram, or the lime in tungstate of lime, into a soluble state. He then puts the ore thus mixed with salt into a cistern formed of granite, slate, stoneware, or other material that is not seriously acted upon by acids (a wooden trough has been found to answer the purpose), and pours upon it such a quantity of either brown acid or oil of vitriol as will effect the decomposition of the salt. The inventor prefers to use an excess of sulphuric acid. He then turns into the mixture a jet of steam from a steam-boiler, so as to keep the said mixture at about 200° Fahr., stirring it about from time to time with a wooden rake or shovel, so as to expose fresh surfaces to the action of the reagents, adding a small quantity, say six or seven pounds to the ton, of nitrate of soda or potash, for the purpose of enlivening and quickening the operation. If the material should contain micacious or magnetic iron ores, it would be advisable to increase the amount of nitrate of soda or potash, to assist their oxidation and conversion. The invention also describes analogous methods of treating the ores when copper or tungstate is contained.

It may further be stated, that an important mineral discovery has recently been made at St. Ives, Cornwall. For some time past traditions have been entertained respecting the existence of a very rich tin lode somewhere on the shore, at about half-tide on the beach at the back of St. Ives. Latterly these have been revived, and a few days since, a party, consisting of about forty working miners and mine agents, after securing the proper grants, combined to try and search for it. They have been well rewarded by discovering an extraordinarily rich east and west tin lode, composed principally of killas, about two feet wide, with veins of very rich tin ore running through it; the lode is very similar to those in West Providence.

## BERDAN'S GOLD MACHINE.

This is an American invention for crushing, washing, and amalgamating gold and other ores, which has, for some time past, been attracting much attention both in the United States and in this country. As the great progress which is making in gold discovery gives importance to appliances for its reduction, the following description of this machine may be interesting to the readers of this Journal.

Its construction is simple. It consists chiefly of a large cast iron basin, about 7 feet in diameter, set at a moderate incline, upon a central shaft, which revolves in suitable bearings. In this are placed two large iron balls, one weighing two and a half tons, and the other about one ton. To the under part of the basin is attached a furnace of conical form. The whole receives motion by means of simple gearing from any suitable power. The operation is as follows: Fire is made in the furnaces, quicksilver is placed in the basin, and the auriferous ore thrown in. The basin is then set in revolution; the balls, by their gravity revolving in a direction opposite to that of the basin, and at the same time receiving a spiral or tortuous movement from their contact with one another. The ore passes under the balls, and is crushed to powder. This crushing is effected at the lowest point in the basin, and below the surface of the mercury, which, with its affinity greatly enhanced by heat, seizes upon the gold the moment it is exposed. The refuse powder rises to the surface of the mercury, whence it is carried off in the form of a thin paste, by a small stream of water, which runs in at the upper side of the basin, and escapes through suitable openings, or scuppers, just below its rim, into a trough, by means of which it may be collected and preserved for analysis, if desired.

The machine depends for its efficiency upon both mechanical and chemical novelties. The rolling and grinding motion, produced by the combination of the inclined basin and the loose balls, is well adapted to the complete crushing of whatever may be brought under its operation; while the application of heat, to increase the affinity between the metals, is, on a large scale at least, believed to be new. The amalgamation takes place with energy at the moment of liberation, and at the point of crushing beneath the surface of pure and heated mercury. This machine is said to extract all the gold contained in the ores which are submitted to its action. No opinion need be expressed upon its merits, as it is said that an opportunity is, in a few days, to be afforded to all members of the Society of Arts who feel an interest in the subject, to witness its actual operation at the Windsor Iron Works, Windsor-terrace, City-road, where it is now in process of erection. A paper upon the subject, illustrated by a model and diagrams, is in course of preparation, and will be presented to the Society early in the approaching session.

## AMERICAN MACHINERY.

The *New York Tribune* thus notices three useful inventions, now displayed at the American Great Exhibition:

"A shoe-pegging machine is exhibited by A. T. Gallahue, of Pittsburgh, Pennsylvania, patented on the 18th of last month. The inventor states that no other machine for pegging boots and shoes is in operation, and we do not remember having seen any, though long ago satisfied, by observing the operation of other machinery, that pegging by machines is practicable. This one is made almost entirely of iron, costs 150 to 200 dollars, and will probably weigh some 200 or 300 lbs. It works very quietly and rapidly, and will peg a shoe or a boot, two rows on each side (leaving a small space at the heel and toe) in three minutes, cutting its own pegs. One man only is required to operate it, without auxiliary power. A good workman will peg a shoe by hand in fifteen minutes, but close application to pegging is considered unhealthy. We asked an Eastern shoe manufacturer, who examined this machine when we did, whether it did its work better or worse than it is done by hand, and he said it drove the pegs more evenly, and on the whole, better. We understand that it is now in practical operation in Pittsburgh; but we believe no other than the one in the Exhibition has yet appeared on this side of the Alleghanies.

"A machine for making cots, or little leathern rolls used in spinning (and of which 20,000 per day, hitherto made by hand, are worn out in Massachusetts alone), is one of the most ingenious contributions of Connecticut to the Fair. Those who are familiar with Whittemore's machine for cutting, bending, and setting card-teeth, or the machine for making chains of brass or other wire, invented at Derby, Connecticut, will readily anticipate its best points. The leather is drawn into the machine in the shape of a strap or belt, is cut off at the proper length diagonally, so as to form the best edges for gumming, is then rolled or doubled over so that the two edges, being gummed in the operation, exactly meet; when they are pressed firmly together, and the now perfected cot dropped through the machine, and another length drawn in to undergo the same process.

"A weighing and packing machine, for packers of tea, coffee, pepper, spices, &c., &c., is exhibited by Slater and Steele, Jersey City, which seems excellent in its sphere, though that sphere is a narrow one. The material is fed from a hopper over head, is weighed in its descent from the hopper, and discharged in pounds, half-pounds, or otherwise as may be required, into a tunnel resting in a square box, into which a paper has already been conveyed by the machine. The box forms one link in an endless chain of boxes revolving around a platform, and moving on a few inches, receives through the tunnel a square stamp just fitted to it, and thence passes to another and another, until the fourth delivers it pressed into a solid mass and enveloped."

## INGENIOUS APPLICATION OF SCIENCE AND THE RESULTS.

A very ingenious application of scientific principles to determine the point of fusion in a closed vessel, and a remarkable result from high pressure on fluids, were incidentally mentioned by the President of the British Association in his inaugural address. Experiments were instituted by Mr. Hopkins, Mr. Fairbairn, and Mr. Jowle, to determine the effect of increased pressure in raising the temperature of fusion. The substance operated on was inclosed in a very strong metal chamber, and the pressure was produced by water forced by a plunger acted on by a long lever down an iron tube, three quarters of an inch thick. Wax was the substance employed; and it was of course essential to ascertain the exact moment that it became fluid when heat was applied. As all the apparatus must necessarily be opaque, the melting point could not be seen. The difficulty was ingeniously surmounted in the following manner: a small magnet was enclosed on the top of the wax, whilst outside the metallic chamber containing it, and on the same level, a nicely-balanced magnetic needle was placed. The enclosed magnet acted on the needle and deflected it, at a certain angle, from its natural position; but the instant that the wax melted, the magnet fell to the bottom, and the vibration of the needle immediately indicated the fact. It was thus ascertained that under a pressure of thirteen thousand pounds on the square inch, wax requires thirty degrees additional heat to melt it; about one-fifth of the whole temperature at which it melts under the pressure of the atmosphere.

During the experiment, it was observed that the plunger gradually descended in the tube, and on examination it was discovered that the water had, under the influence of the enormous pressure, been forced through the pores of the iron, though three-quarters of an inch thick. On afterwards examining the tube closely with a lens, not the least opening could be seen by which the water could have escaped. This result far exceeds that of the celebrated Florentine experiment, by which the incompressibility of water was supposed to be proved by its forcing a passage through the pores of a globe of silver, very thin in comparison with the three-quarter inch iron tube. It was not ascertained whether any of the melted wax had been forced into the pores of its containing vessel.

## LEATHER WITHOUT BARK.

THE *Gardeners' Chronicle* of Saturday says: — We fear that we have unwelcome news for our friends whose interests are concerned in woodland property. The low price of British timber, excepting oak, has long been a serious misfortune to them, enhanced by the declining price of bark, even when cured upon a more rational plan than that employed by some of the gentlemen managing the Royal forests. But now it would appear as if bark itself was likely not to be worth the stripping.

It was stated in the *Mechanics' Magazine*, of September 18th, 1852, that a Mr. Preller had taken out a patent for preparing skins with materials of which bark formed no part. He used, on the one hand, vegetable substances, consisting largely of starch, and containing little gluten, such as barley flour, rice flour, or even starch itself; on the other, butter, milk, grease, and other fatty animal matters; to which he added salt or saltpetre in certain proportions. With this mixture, skins prepared in the usual manner are smeared, after which they are agitated in a revolving cylinder for a certain length of time, when they quickly become ready for the currier.

In a late number of the same publication it is stated, that "this method of treatment is so remarkable for its originality, and attended with such excellent advantages in the course of manufacture, and in the character of the produced article with reference to the requirements of practice, as to promise nothing short of a complete revolution in the arts of the tanner, and the establishment, to a certain extent, of new criteria by which the qualities and value of leather for practical purposes are henceforth to be estimated. A large factory in Lant-street, Southwark, has been fitted up by Mr. Preller, and he is there carrying on his manufacture to a very considerable extent, and with a degree of success which could hardly have been supposed would attend his efforts in the comparatively short time which has elapsed since he began. His leathers have already acquired a high reputation in the market, and are rapidly getting into favour for a variety of manufacturing purposes, especially for driving bands, for which their superior strength, flexibility, uniformity of texture, and durability, render them eminently serviceable."

The difference in quality of the skins thus treated and such as have been tanned with oak bark, catechu, or similar substances, is represented to be strikingly in favour of the patent process.

The peculiar merits of Preller's method are said to be these. It reduces the weight of leather, and at the same time increases its strength; and this takes place to such a degree that "it has been found that oak-tanned leather of 3-8ths of an inch in thickness is incapable of resisting a strain which Preller's leather, 1-4th of an inch in thickness, will resist in constant working. A strip of it a yard long, about half an inch in width, and 1-8th thick, gave way with a breaking weight of 6 cwt. 20 lbs.; while ox-hide, well tanned on the oak-bark system, and of the same dimensions, could only resist a strain of 5 cwt. As another illustration of the superior strength of Mr. Preller's leather for driving-bands, we may mention a circumstance which was told us at the factory, that on one occasion, to lengthen a driving-band made of his own leather, he added to it a piece of oak-tanned, and that the latter gave way in the performance of its work. Sheep-skins, kid-skins, and some other species of leather, which in general may be torn asunder in the hands with the exercise of only a small degree of force, acquire in this process a strength which is quite surprising, of which we had experience ourselves when a piece of split sheep skin, of large size, was put into our hands, and we were requested to try to break it."

Another great advantage in Preller's process is represented by the same authority to consist in saving time in the process of preparing. "The thickest ox-hide requires only two days and a half to be fully converted by the application of this process, of which Mr. Preller showed us an example in the hide of a large prize ox exhibited at the late cattle show. Under the most favourable circumstances, it now requires four or five weeks' subjection to the tanning liquor. Under the old process of tanning, in which the hides were placed in the pit, with layers of tan to separate them, and afterwards filled with water, a very considerable period has been known to elapse during the process; sometimes amounting to four years. This old-fashioned method has not been yet completely abandoned for more scientific ones, and contrasted with it the great change which this invention has effected is the more remarkable. The walrus skin exhibited in the Great Exhibition took no less than four years to tan; but Mr. Preller estimated that by his mode of treatment the conversion would be perfect in sixty hours, allowing six periods of agitation in the drum, each of ten hours' duration. The economy of time in the conversion of the hide is a circumstance strongly favourable to the practical working of the system, and is calculated to give to this branch of industry a degree of activity not hitherto experienced."

It is further stated that leather prepared thus, without tan, possesses greatly increased capacity for resisting the passage of water, combined with remarkable suppleness so that for boots and shoes it is far preferable to tann leather. "When ordinary leather," says our well-informed contemporary, from whom we borrow these particulars, "is boiled in water, it gradually hardens and becomes rigid; and if the operation be continued for half an hour, it will be found to have assumed a kind of woody texture, and to have become brittle. Some descriptions of leather, on the other hand, become converted into a mass somewhat resembling glue. When Preller's leather is tried in the same way, it gradually approaches to the condition of horn, but it requires several hours before that state is attained. In its ordinary condition, as before observed, it is remarkably supple, and that quality admirably fits it for being used in the soles of shoes; for the West and East Indies, in particular, this quality is highly advantageous, and for the supply of troops would probably be found to be attended with economy, and productive of comfort."

We can hardly over-estimate the importance of these facts to country gentlemen; for, if further experience shows them to be fairly stated, of which we have no reason to doubt, then it is clear that the timber on an estate will become seriously depreciated, and all valuations will have to be made upon an entirely new basis.

## HOME CORRESPONDENCE.

### ON THE IMPROVEMENT OF LEATHER.

Sir,—Dr. Lyon Playfair stated at our society, in Jan., 1852, in his very interesting lecture, "On the Chemical Principles involved in Manufactures, as indicating the necessity of Industrial Instruction," that the processes recommended by scientific men for improving the Manufacture of Leather, have been unable to satisfy the many physical conditions involved in the production of good leather;—that the use of terra japonica, divi divi, sumach, and other substitutes, containing a greater amount of tannin than oak-bark; and also the mechanical means, such as pressure or squeezing, for the purpose of hastening the absorption of tannin, and other appliances for accelerating the process, have failed to produce a better article, and had, at the best, but a doubtful success;—that the manufacturers have reverted to their (more than 1800 years) old traditional modes of preparation;—and that there is a wide chasm between the chemist's laboratory and the workshop, which has to be bridged over by the united aid of the philosopher and the manufacturer, who, if working together, may achieve great results; but they must act on a common plan.

It is now nearly twenty months since this combined action was recommended; but I am not aware that such a plan has been adopted, and doubt that it would be carried out successfully. The first step required towards producing an improved article is, to become acquainted with and acknowledge the faults of it as then manufactured. Will our tanners do this? I doubt it; and do not consider it surprising, that after the different useless attempts to improve leather by following the plans recommended by chemists and other scientific men, any further new modes of manufacture are declined, and the old plan of making leather by immersion in solutions containing tannic acid is pursued; although it is well known that the acid (which chemists consider requisite to produce the insoluble compound called by them tannate of gelatine, or leather) acts more injuriously upon the fibres of the skin in proportion to the strength in which it is applied; and that a weak solution, which acts powerfully during the first seven days on the surface, has not penetrated to the centre after two months immersion; so that the surface will be over-tanned by gradually increasing the strength of the tannic acid, and will become brittle and harsh before the internal substance is fully acted upon.

It appears to me more likely that those who are not tanners or chemists, and free from the opinion that an acid is indispensable for changing the nature of the skin, will meet with better success; but they must study the requirements of those who work up and use leather, and endeavour to produce qualities suitable for the different purposes to which the leather is to be applied.

The Society of Arts might assist this end by collecting such information, and causing experiments to be made, regarding the strength and other properties of leather. Appearance alone forms no guide in choosing a good article; and as colour or a glassy surface is the principal quality to be observed at an exhibition, more useful knowledge would be acquired if application was made to the authorities at one of the royal dockyards, where machinery for testing materials is at hand. The weights which metals, stones, and wood, will bear without breaking, and those which produce fracture, are well known; but I am not aware of any published statistics as regards the various kinds of leather, and particularly such as is suitable for driving bands, harness, hose, boots and shoes, and military accoutrements.

Such information would be very acceptable to engineers, mill-owners, and many others, and I hope that the Council of our Society will further the object in view.

I am, Sir,
Your obedient Servant,
A Member.

## PROCEEDINGS OF INSTITUTIONS.

Bicester.—The First General Meeting of the Literary Institution was held on Tuesday evening, the 20th inst. In the absence of the President, Captain Style, R.N., the chair was taken by the Rev. J. W. Watts. After the election of officers for the ensuing year, the report was read, from which it appeared that though the Society was only formed in February of the present year, it already numbered 173 members; 56 of whom were honorary, and 117 ordinary. The income was 67*l.* 5*s.* 1*d.*, and the expenditure had been 52*l.* 4*s.* 0½*d.*, leaving a balance in hand of 15*l.* 1*s.* 0½*d.* The number of volumes in the library was 400, and the number issued to members had been 1008. Evening classes have been held for the improvement of the members in Writing and Arithmetic, and a Philharmonic Class had afforded the opportunity to many of the members of improving themselves in the science of music. Four lectures, all of which were well attended, had been delivered during the session: "On the Fall of Jerusalem," by Mr. Hamilton; "El Dorado," by E. Watkin, Esq.; "Life of the Duke of Wellington," by the Rev. J. J. Irwin; and "Crusades," by the Rev. T. C. Whitehead. One concert was given by the members of the Philharmonic Class, and an Exhibition of Dissolving Views by one of the members, interspersed by suitable addresses from Rev. J. W. Watts, Rev. W. Ferguson, and others.

## TO CORRESPONDENTS.

*Drying Printers' Ink.*—"H. C. G." wishes to know whether there is any chemical solution (or otherwise) which could be applied to a sheet of paper, so as instantaneously to dry (or nearly so) the printers' ink when printed on it.

**Notice.**—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

*Country Institutions.*—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

## MISCELLANEA.

MANCHESTER FREE LIBRARY.—This Institution, which was opened to the public on the 6th of September, 1852, has, in rather less than a year, issued in the Reference Library 61,488 volumes; Lending Library, 77,648 volumes; total issues, 139,136 volumes.

PRODUCTS OF ALGERIA.—The French Government is about to exhibit, at No. 6, Rue de Bourgoyne, a collection of articles from Algeria, consisting of cotton, silk, cochineal, corn, oilseeds, wool, timber, wine, sugar-cane, stuffs of various kinds, saddles, &c., &c.

PRESERVATION OF THE SHEATHING OF SHIPS' BOTTOMS.—The French Minister of Marine has ordered experiments to be made at Cherbourg and Brest with some metal prepared by electricity, and with an amalgamation of mercury, which, it is said, resists oxidation, and remains, when used as a sheathing for ships' bottoms, perfectly clean, no matter in what sea, or during what length of time.

ELECTRIC TELEGRAPH IN MADRAS.—Mr. Kenrick, of Madras, announced, it is said, on the 1st of August, that from that date the Electric Telegraph would be in operation between Captain Biden's Office and the Observatory, a distance of somewhat less than five miles, the earth, or return circuit, making it double. He also states that he will now give attention to the completion of the Time Ball; and when all is perfect, he intends to bequeath the whole system to the community of Madras.

MONUMENT TO JAMES WATT.—The Directors of the Watt Institution and Edinburgh School of Arts, have resolved to erect a monument to the memory of James Watt, in Adam-square, Edinburgh; and His Grace, the Duke of Buccleuch, has liberally presented to the Directors a splendid block of stone, weighing upwards of ten tons, and taken from the Granton Quarry, for the purpose. Mr. Peter Slater has been selected to execute the work. The statue will be eight feet high, representing the philosopher in a sitting posture, with a scroll in one hand and a pair of compasses in the other.

STEAM FIRE-ENGINE.—The prevalence and progress of destructive fires in America is, it may not be generally known, diminished very much by the use and application of what is known there as the steam fire-engine. In its form it is somewhat similar to a locomotive, throws upwards of a 200 feet jet, and about 2,000 barrels in an hour, in from one to six streams of water. The machine may be put in operation in five minutes, requiring four men and four horses, and is calculated, it is said, to do as much as six of the ordinary hand engines. At a fire in May last, at Cincinnati, of a large brewery, the engine discharged a cataract of 15,000 barrels of water in eight hours, and nothing but this could have saved the entire square in which the brewery was from destruction.

THE ATLANTIC AND PACIFIC JUNCTION RAILWAY.—Surveys for the great central railway route destined to unite the Atlantic and Pacific are proceeding. The surveyors have already reached the Great Colorado of the west, to which point the passage is found to be a continuous valley, good for railway and for settlement. The pass at present selected is curiously ascertained to be the primeval buffalo route across these wild regions, this route being adopted by the enterprising surveyors from a knowledge of the fact that if they follow it they will have a line direct "as the crow flies," the buffalo, it appears, having an instinct in finding his way by the nearest, most direct, and richest route.

LARGE DISCOVERY OF METALLIFEROUS ORE IN TURKEY.—The Constantinople correspondent of the *Daily News* says that Messrs. Leahy, in the course of surveying for the contemplated railway, have found large fields of all kinds of metalliferous ore, viz., gold, silver, mercury, copper, lead, antimony, arsenic, and iron; and also coal, alum, salt, saltpetre, and sulphur, the annual produce of which has been calculated at four millions sterling. The gold has been found near Adrianople, in the plains formed by the earthy deposits, and in the ferruginous sands of the river Arda, and also on the slopes of Mount Pelion and Mount Ossa, in Thessaly, intermixed with extensive deposits of lignite. The silver and lead mines appear to be of most value, and of immense extent, particularly those of Mount Pelion, where more than 200 different galleries have been already opened, showing an amount of richness in mineral deposits almost fabulous. The lead mines of Mount Pelion are only three or four miles from the harbours of Zaora and Volo, and have an abundance of water power and fuel.

THE LAWSON OBSERVATORY.—Mr. Lawson, of Bath, having offered his collection of astronomical and meteorological instruments, valued at £10,000, and 1,000 guineas towards the formation of a permanent fund of £10,000 for the establishment of a Midland Counties Observatory, the Lords of Her Majesty's Treasury have expressed their willingness to recommend a grant of £2,000 in aid of the funds, provided the remaining £8,000 be raised by subscription. The offer of Mr. Lawson has been for some time before the public; but owing to his declining health, it has become necessary that an immediate decision on the part of the Committee as to their capability to comply with the terms of the bequest should be arrived at. The offer of Mr. Lawson is to be withdrawn on the 1st of October, unless the remaining sum is subscribed by that date. On Tuesday last the Committee had received as much as 7,700*l.*, leaving 2,300*l.* still to be collected in the last four days. Should this not be the case, the nation will lose a favourable opportunity of establishing an important public Institution, calculated to advance greatly the science of meteorology.

GROWTH OF COTTON IN AUSTRALIA.—The Governor-General directs it to be notified that, with a view to encourage the cultivation of cotton in New South Wales, the following sums, which were provided for the purpose by the Legislative Council, but have not yet been awarded, in consequence of no specimens having been exhibited, will be given as premiums for the best samples of that article grown in any part of the colony, and exhibited in Sidney on or before the 1st of June, 1853, viz.:—1. For the best sample, weighing not less than 50lbs., £30. 2. For the second sample, weighing not less than 50lbs., £20. The particular qualities required are length, strength, firmness, and silkiness of staple, and brightness of colour Proof will be required that the cotton wool exhibited is the produce of the colony by the certificate of a magistrate, or of some other known person of respectability. The samples are to be delivered at the colonial stores at Sidney, and the awards will be made by a board to be appointed by the Governor-General.—*Australian and New Zealand Gazette.*

THE COAL FIELDS OF NEW SOUTH WALES.—The *Australian and New Zealand Gazette* says, "Almost every great district in the colony has been ascertained to possess in abundance this great gift of Providence, and it is in positions, for the most part, of comparatively easy access. To the south, to the west, and to the north, it is to be found in our ranges in immense quantities, and when enterprise, the desire of gain, or the necessity of their position, shall spur the inhabitants of these districts into action, they will produce it with the like ease, in the like abundance, and with the like profit, that the people of the Hunter have done. Newcastle may, like her namesake at home, be the main source of the supply of the metropolis, and her position on the coast enables her to do so with great facility; but the coal mines of Bathurst will not only supply the domestic wants of the district, but by their very richness, combined with the other mineral wealth with which they are closely associated, they will, in course of time, like the Staffordshire mines in England, force into existence towns that will rival the Birminghams, the Wolverhamptons, the Bilstons, and the Dudleys at home."

New Plan for the Ventilation of Coal Vessels.—The frequent and lamentable explosions which have so often and recently occurred to the vessels and colliers engaged in the shipment of coal from the Welsh ports, have caused the adoption of a most ingenious plan for the prevention of these accidents. Vessels proceeding on long voyages, laden with the Welsh steam and other coals, are now generally fitted after the new manner, and into such favour has it risen that it is deemed indispensable by the Liverpool commercial community that vessels engaged in the foreign coal trade should be fitted up on the improved system, which is done after the following manner. The great object is to prevent the accumulation of "foul air," and to do this a thorough draft or ventilation is gained by lining the hold, before the vessel is loaded, with sleepers, bearing alternately from the deck half way to the keel, and *vice versâ* from the keel upwards. These are four or five inches in depth, and three feet apart; and on them is laid a flooring, which passes the whole length of the hold, leaving the wide space underneath for the purpose of fresh air. This current is sent down from the decks by means of six wooden funnels, 12 or 18 inches square, which, placed perpendicularly, run two from the fore, main, and after decks each, down to the space left at the bottom of the hold, thus securing an uninterrupted passage for the fresh air. The inner surfaces are thus kept cool, and vessels on a six months' voyage need not apprehend any danger from explosion, as was formerly the case.

Time Signal Ball in the Strand.—Professor Airy has just issued the following notice to chronometer-makers and to the public: The system of dropping the Time Signal Ball on the buildings of the Electric Telegraph Company, 448, Strand, by a galvanic current from the Royal Observatory, Greenwich, having, after the experience of several months, been found perfectly efficient (interrupted only by occasional repairs of the apparatus), chronometer-makers and others are informed that when no extraordinary signal is exhibited, implicit reliance may be placed on the accuracy of the time given by the drop of the ball. The same galvanic current which liberates the ball in the Strand moves a needle upon the transit clock at the Royal Observatory. The time of movement of this needle is observed by the officers of the Royal Observatory, and duly registered, and is found to be sensibly correct. The time occupied by the transmission of the galvanic current from the Royal Observatory to the Strand is about 1-3000th part of a second. The time occupied by the unloosing of the machinery which supports the ball is less than one-fifth part of a second. Chronometer-makers are requested to remark that the instant which is to be taken as truly corresponding to one o'clock, Greenwich mean solar time, is that of the commencement of the drop of the ball. In the event of accidental failure or error in the dropping of the ball at one o'clock, it will be raised half-mast high till two o'clock, when it will be dropped with the same accuracy.

Drainage of a Loch by means of a Syphon.—Culhorn Loch, in the county of Wigton, was drained, under the direction of the celebrated Marshal, Earl of Stair, more than 100 years ago, by a drain, or cut, some places thirty-six feet deep. That operation still left about eight acres of water, above sixteen feet deep in the centre, and fully twenty acres of marshy ground, which could not be drained without more fall than the whole cut could afford. This marsh had long been considered an eyesore, being immediately in front of Culhorn-house, a seat of the Earl of Stair; but the expense of deepening the outlet, in some places through quicksand, seemed so difficult and expensive, that although often talked of, the operation was never undertaken. The present Earl of Stair, some time before his accession, was anxious to drain the marsh; and having set his mind to consider various plans which were suggested, his Lordship appears to have succeeded by an operation which, it is believed, is new in the annals of draining, at least on so great a scale as in the present case, viz., by means of a large syphon. The syphon referred to is 880 yards long (exactly half a mile), and is seven inches in diameter. It has now drawn off nine feet deep of the water in the loch, which it is expected will give fall to enable the proprietor to drain properly the marsh already referred to, and to reduce the loch to an ornamental pond. The highest part of the syphon is twenty-one feet above the present surface of the loch, and the longest limb of the syphon is ten feet under the level of the water, giving ten feet of fall. The main part of the syphon consists of cast-iron pipes 5-8ths of an inch thick, with spigot and faucet joints very carefully joined and made air-tight with lead. The contract expense of the iron pipe laid, when complete, was 7*s.* 6*d.* per yard.—*Wigton Free Press.*

Inventors and Inventions.—"In the intellectual, as in the material world, the most precious productions are those which cannot spring to perfection at once; and it would be as reasonable to inquire to what refreshing shower, or to what gleam of sunshine, the stature of a stately oak is attributable, as to what individual mind we are indebted for the creation of our modern steam-engine. The exertions of different minds are merely so many agencies that have been happily conducive to a general result; and it would be as just to assign the invention of our modern men-of-war to Jason, as to assign the invention of the steam-engine to Savery or De Caus. * * * The steam-engine happens, no doubt, to be from first to last an English invention; but that result, we conceive, is not so much to be attributed to the superior genius of the English people as to the force of circumstances, which made some such instrument as the steam-engine more valuable to England than to other nations. * * * It is to the force of circumstances chiefly that the superior proficiency of the present age in such devices is to be ascribed; and we hold it vicious in principle to confound this impelling power with the ingenuity appertaining to particular inventors, and which Nature dispenses with wonderful uniformity to all generations. * * * The same wants generate so naturally the same expedients for their relief, that simultaneous discoveries and inventions become inevitable, and identical projects start up at different epochs without imitation under the force of similar circumstances. * * * Inventions sown in one age are ripened in another by the progress of events, but a multitude of agencies are necessary to the final effect—and of these the most important is Time. Individual projectors are merely like bubbles floating upon the waves of that majestic stream; though higher than the other aqueous particles around them, yet their altitude is not to be measured from the position of the lowest surface, and they are not the cause of the general exaltation."—*Bourne on the Steam-engine.*

Photography.—A discussion has taken place at the Academy, between MM. Arago, Biot, and Chevreul, as to the respective rights of Mr. Talbot, of London, and M. Niepce de St. Victor, as to the invention of photographic engraving on plates of steel. The processes of these chemists are different. Mr. Talbot uses, for the substance impressible to light, a mixture of gelatine and bichromate of potash, which is modified and browned on the immediate contact of light, and only where the light acts, whilst the part covered by the object to be copied remains untouched, and may always be removed by water. M. Niepce has aimed to perfect the process which his uncle, the inventor of heliography, described in the year 1827. The sensitive substance is a solution of bitumen in essence of lavender, applied in a layer; this varnish changes its properties while under the action of light. The parts exposed to the sun become insoluble in a mixture of essence of lavender and oil of petroleum, so that they may be easily separated from the soluble part not impressed, which represents the image to be reproduced. The liquid employed by Mr. Talbot for biting in on steel after his design, is bichloride of platinum, and that of M. Niepce, a mixture made of one part of nitric acid, eight parts of distilled water, and two of alcohol. We mention only these general facts, the details belonging more especially to the domain of technology.

**Locomotion by Compressed Air.**—The obstacles which have till now opposed the employment of the expansive force of compressed air will, it is thought, disappear through the process of M. Julienne, which consists simply in compressing air by means of an hydraulic press. By this method, M. Julienne substitutes for the *solid* piston—which a grain of sand may alter, which the slightest irregularity in the pump would throw out of action, and which becomes heated by friction—a liquid piston, not less incompressible than the other, filling always exactly the space in which it moves, be it regular or not, and acting by progression on a resistance so exactly calculated, that its proportion, although increasing, is always in relation to the force to be overcome. The air is thus compressed at thirty atmospheres in iron bottles, which are about four millimetres thick. It is perfectly preserved under this pressure; and it was with a bottle of this kind that M. Julienne put in action a small vehicle, carrying two persons, and moving with great rapidity.—*American Journal.*

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette*, 23*rd September*, 1853.

*Dated 12th August*, 1853.

1892. D. J. Picciotto, 8, Crosby-square, London—Improvements in weaving. (A communication.)

*Dated 24th August.*

1963. G. Culverhouse, 72, English-street, Hull—Manufacturing compost or manure.

*Dated 29th August.*

2002. P. A. le Comte de Fontainemoreau, 4, South-street, Finsbury—Apparatus for heating. (A communication.)

*Dated 8th September.*

2063. S. G. Pape, 34, Gloucester-crescent, Camden-town—Brace-ends, new suspenders for trowsers, &c.
2064. J. G. Lynde, jun., 37, Great George-street, Westminster—Pressure-governor, or self-acting apparatus for regulating flow of water.
2066. J. D. Brunton, Truro—Wind-guard or chimney-top.
2067. J. Petrie, jun., Rochdale—Cans for applying oil to machinery.
2068. J. Coate, 19, Marylebone-street, Regent-street—Tooth, nail, and hair-brushes.
2069. J. Burrows, Haigh Foundry, Wigan—Construction of rolled metallic plates.
1070. W. Hall, The Colliery, Castlecomer—Conversion of peat into charcoal.

*Dated 9th September.*

2074. J. H. Johnson, 47, Lincoln's-inn Fields—Apparatus for facilitating the acquirement of the art of reading. (A communication.)
2076. M. L. Parnell, The Strand—Construction of locks.
2078. J. Doyle, 17, Cambridge-terrace, Paddington—Ventilation of tents and marquees.
2080. C. Askew, 27½, Charles street, Hampstead-road—Improvements in baths.
2082. J. Amory, Boston, United States—Improvements in furnaces.
2084. H. Woodhead, Kingston-on-Hull—Spinning machinery.
2086. A. V. Newton, 66, Chancery-lane—Manufacture of gas-burner and gas-regulator. (A communication.)

### WEEKLY LIST OF PATENTS SEALED.

*Sealed 22nd September*, 1853.

699. Thomas Bouch, of Edinburgh—Improvements in signals.
708. Bernard Boyle, of Raven-row, Mile End—Invention of a centripetal flange.
709. Hesketh Hughes and William Thomas Denham, of Cottage-place—Improvements in pianofortes, organs, seraphines, and other like musical instruments.
717. Henry Webster and Edward Dawson Stones, of Sheffield—Improvements in the construction of gas-stoves.
726. Robert Hazard, of Lincoln's-inn Fields—Invention of a "Podombrosloutron," or an improved apparatus for either sponge or shower-bath, and all lavatory purposes.
731. George Robb, of Glasgow—Improvements in the manufacture of sulphuric acid, alkalies, and their salts.
733. George Oakes Asbury, of Birmingham—Improvements in the manufacture of dowls used in joinery.
773. George Hanson, of Huddersfield, and David Chadwick, of Salford—Improvements in apparatus for measuring gas, water, and other fluids; which improvements are also applicable for obtaining motive power.
882. Eliza Cunnington, of Devizes—Improvements in the decoration of furniture panels and other surfaces.
904. Joseph Adamson, of Leeds—Improvements in flushing apparatus and in water-closets.
928. Henry Wilks, of Rotherham—Improvements in cocks.
1023. William Reid, of University-street—Improvements in apparatus for testing the insulation of electric telegraph wires.
1339. Anthony Bernhard Baron Von Rathen, of Wells-street—Improvements in the mode of, and in engines for, applying motive power.
1480. James Hogg, junior, of Nicholson-street, Edinburgh—Improvements in the application and combination of glass, porcelain, stone ware, earthenware, terra cotta, composition in plaster, of the kind called scagliola, and majolica ware.
1487. Jacques François Dupont de Bussac, of Upper Charlotte-street—Improved mode of making, with iodine and its compounds, in combination with substances containing extractive principles, various elementary combinations.
1520. John Leach, of Over Darwen—Improvements in looms for weaving.
1535. Joseph Rock, junior, of Birmingham—Improvements in spring or clasp-knives, applicable to such other articles as shut or close after the manner of clasp-knives.
1554. William Fairclough, of Stockport—Improvements in looms for weaving.
1649. Henry Brougham Hopwood, of St. George-street East—Improvements in ships' ports or scuttles.
1687. Henry Bessemer, of Old St. Pancras-road—Improvements in the process of refining and manufacturing sugar.
1689. Henry Bessemer, of Old St. Pancras-road—Improvements in the manufacture and treatment of bastard sugar and other low saccharine products, such as are obtained from molasses and scums.
1691. Henry Bessemer, of Old St. Pancras-road—Improvements in the manufacture and refining of sugar.
1708. Peter Armand le Comte de Fontainemoreau, of South-street, Finsbury—Invention of a new mode of equilibrating indefinitely the weight of atmospheres. (A communication.)
1719. John Dent Goodman, of Birmingham—Improvements in lanterns.
1763. Alfred William Warder, of Sydney-street, Brompton—Improvements in gas stoves.
1764. Francis Arding, of Uxbridge—Improvements in threshing-machines.
1776. James Mackay, of Aigburth, near Liverpool—Improved apparatus for propelling vessels.
1790. John Gray, of Rotherhithe—Improved apparatus for consuming smoke.

*Sealed 24th September.*

716. Charles Victor Frederic de Roulet, of Paris—Improvements in the manufacture of piled figured fabrics, by alterations in, and additions to, looms for weaving; including also a warping-machine, with a method of reading and arranging the colours or materials for the patterns of such figured fabrics.

### WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Sept. 22 | 3512 | Oscillating Safety-valve | Thomas Cowburn | Manager of the Eagley Foundry, near Bolton-le-Moors, Lancashire. |
| „ 23 | 3513 | Portable Crochet Cotton-reel Holder | William Collimore | 2, Railway-street, Brighton. |
| „ 24 | 3514 | Spring Bible and Prayer Case | Thomas Brindley | 2, Leonard's-square, Finsbury. |
| „ 26 | 3515 | A Rib or Tooth of a Crusher or Crushing-Roller | Joseph Chant | Bristol-road, Bridgewater. |
| „ 28 | 3516 | Barlow's Registered Cinder-sifter | James Barlow | 14, King William-street, Mansion-house. |

# SOCIETY OF ARTS.

**FRIDAY, OCTOBER 7th, 1853.**

## NOTICE TO INSTITUTIONS.

THE Council beg to announce that Mr. C. D. Collet, Secretary to the Association for Promoting the Repeal of the Taxes on Knowledge, is anxious to give Lectures on that subject at the Institutions in Union, during the Christmas holidays,—say from the 17th of December to the 31st of January inclusive. Mr. Collet proposes to deliver his Lectures gratuitously, but not to contribute anything towards the local expenses. Those Institutions that are desirous of availing themselves of this offer should communicate with Mr. C. D. Collet, 20, Great Coram-street, Russell-square, London, with as little delay as possible, that he may be enabled to make out such a route as shall embrace the greatest number of Institutions within the time specified.

Mr. Robert Scott Burn, Member of the Society of Arts, and Author of "Practical Ventilation, as applied to Public, Domestic, and Agricultural Structures," and other works on sanitary science, is also willing to deliver a Lecture at any of the Institutions in Union in the Midland Counties and Yorkshire, on "Sanitary Science, as applied to House-construction and Convenience," free of all charge whatever, save and except that he would leave it for circumstances to decide as to whether he would make a claim for travelling expenses, in cases where the Institutions were not notoriously poor. It is requested that any Institution situated in the above district, wishing to embrace this favourable opportunity of receiving a Lecture on a subject of such vast social importance, will communicate with Mr. R. S. Burn, Bank-cottage, Stockport, stating the time when they would like to have the Lecture, and other necessary particulars.

## THE PAPER DUTY.

### QUERIES PROPOSED BY THE SOCIETY OF ARTS, MAY 4TH, 1853.

### No. 6.—To AUTHORS.

THE following closes the series of Queries and Replies on this subject. The five previous sets, addressed respectively to Manufacturers, Wholesale Stationers, Manufacturers from Paper and Manufacturers using it, Publishers, and Newspaper Proprietors and Editors, will be found in Nos. 33, 34, 36, 37, and 39; pages 401, 413, 437, 449, and 475, of this Journal.

**1. What is the effect of the Duty on the relations between Authors and Publishers?**

Sir DAVID BREWSTER says, "It prevents *authors* of works of profound science and literature from having any *relations* at all with *publishers* who cannot afford to publish such books. The authors of such works can get them printed in every other country but this."

Mr. C. D. COLLET says, "It cripples or destroys the author's fund, and reduces the publishers of fiction to have recourse to writers who, having no power of moving the intellect, excite the appetite instead."

Mr. CHARLES DICKENS says, "I am not aware that it has any."

Mr. ANGUS B. REACH says, "No doubt its effect is to hamper and circumscribe these relations. I consider that the duty seriously affects the sale of cheap books by tempting the use of the very vilest paper; there being, as I have often observed, a strong predilection in the popular mind for books at once pretty and cheap."

Mr. LEITCH RITCHIE says, "The duty on paper bears a very small proportion to the whole cost of producing an ordinary book, magazine, or review; and its effect therefore on the relations between authors and publishers is hardly appreciable. It bears a very large proportion, however, to the whole cost of producing the successive numbers or volumes of a cheap serial, and it compels the publishers of such works, therefore, to confine the author's remuneration within as narrow limits as possible. To illustrate this, I may say that the duty on an impression of 60,000 of a single Number of "Chambers' Repository of Tracts," price 1*d.*, would amount as nearly as possible to 19*l.*, more than the author's remuneration; whereas the duty on an edition of 500 of an ordinary novel, price 1*l.* 11*s.* 6*d.*, would amount only to about 8*l.* If we suppose the novelist to receive so little as 100*l.* for his work, the Paper Duty is 8 per cent.; while in the former case it is more than 100 per cent."

Mr. T. TATE says, "The duty is a disadvantage to authors."

**2. Has it any tendency to throw the publishing business into the hands of a few capitalists?**

Sir D. BREWSTER says, "Certainly. All the taxes upon knowledge have this tendency, and capitalists have a monopoly, from this cause, of the publishing business."

Mr. C. D. COLLET says, "Probably."

Mr. CHARLES DICKENS says, "Not to my knowledge."

Mr. ANGUS B. REACH says, "It must have such a tendency. The trades requiring the greatest amount of capital must have the fewest professors. At the same time, there is a tribe of low publishers and booksellers, the getters-up and sellers of Holywell-street garbage, whom I would be loath to see encouraged. As to the question, a great amount of the publishing business of London is concentrated in very few hands indeed. The smaller publishers are frequently special publishers."

Mr. LEITCH RITCHIE says, "It has no such tendency with high-priced books; and with regard to cheap works, the tendency is controlled by a case I shall afterwards explain."

Mr. T. TATE says, "Undoubtedly it has."

**3. In joint undertakings between author and publisher for a division of profits, does it postpone the author's receipt of his share by laying a heavy burden upon the material for the production of a book? and does it eventually diminish his share by increasing the risk of printing, and thus compelling small editions to be printed, or rendering it necessary to stereotype, instead of printing a large impression?**

Sir D. BREWSTER says, "In consequence of the duty on paper, a longer time must necessarily elapse before any profits are realised. It diminishes his share of the profits when they are realised, and compels the publisher to print small editions, and to stereotype and re-work them previous to a profit."

The Rev. Derwent Coleridge says, "I am clearly of opinion that the duty on paper lessens the profits of the authors in all the ways above specified; and that if it be necessary to compensate this by an increase of price, a loss, perhaps proportionally greater, may be expected to ensue from diminished circulation."

Mr. C. D. Collet says, "I should think so."

Mr. Charles Dickens says, "In answer to both questions, I believe such arrangements to be altogether irrespective of the paper duty, and to bear no reference to it. The publisher prints what he hopes to sell, and proceeds in what he considers the most prudent way. No reasonable publisher or venturer in publications would hazard a very large impression on the chance of selling it, when the process of stereotyping is so cheap and easy."

Mr. Angus B. Reach, says, "It must necessarily do all these things, or at least strongly tend to do them; an author can of course, if he publish on the terms indicated in the question, expect no remuneration until the sale of the book has paid its commercial expenses,—the duty must necessarily retard that period. As to the second part of the question, I think that small editions, and closed packed type—most unpleasant to read—are frequently the effects of the paper duty. To authors who cannot expect a very great degree of circulation, a tolerably large or handsomely printed edition is at present an impossibility. I have no doubt that their circumstances would—were the paper duty removed—be much benefited.

Mr. Leitch Ritchie, says, "This has been answered in No. 1."

Mr. T. Tate, says, "Yes."

### 4. Has it circumscribed the limits of the literary profession, and depressed its character by stinting its rewards?

Sir D. Brewster, says, "Certainly."

Mr. C. D. Collet, says, "Certainly."

Mr. Charles Dickens says, "I should say, decidedly not."

Mr. Angus B. Reach, says, "The answer to this question follows as a corollary on the others. No doubt the paper duty has done both things. Well paid, or at all events respectably paid literature, is a pursuit eminently ennobling; but those authors, many of them able but unsteady men, who are content to drudge in the lower spheres of vulgar tale-writing, or hack translations, and who are miserably paid—not one-fourth so well I should think as penny a liners—these men may well execrate the day they took to pen and ink. No doubt the fault is often to be attributed to themselves, but the depressing commercial influences by which their employers are surrounded as certainly re-act upon them also."

Mr. Leitch Ritchie, says, "The literary profession is subject to the ordinary laws of political economy. The price of its labour, like that of all other kinds of labour, depends mainly upon the supply. When the cost of paper was *higher* than at present, authors were paid better, simply because there were then fewer persons capable of writing tolerably well. Novels, for instance, are as good now as they were fifteen years ago, and they are written for less than half the money. An author does not write better than other people merely because it is his trade to write; and his trade, therefore, has been to a certain extent swamped by the crowd of non-professional interlopers. The sufferers are those who do not write so well as the interlopers. If the paper duty is only eight per cent. in a high-priced author's remuneration, it cannot have the effect of circumscribing the limits, or depressing the character of the literary profession. The cost of paper, besides including price and duty, has in the course of the last twenty years fallen to the extent of 3½*d*. per lb. The present duty is 1½*d*., and five per cent."

Mr. T. Tate says, "It has."

### 5. Has it operated injuriously upon periodical literature of all kinds, including newspapers? and does it keep down their circulation?

Sir D. Brewster says, "Certainly."

Mr. C. D. Collet says, "It operates very injuriously on all periodical literature, including newspapers, but I do not think it keeps down their circulation."

Mr. Charles Dickens says, "I think not."

Mr. Angus B. Reach says, "No doubt it has. The principle applies in its hurtfulness to every branch of literature, periodical or otherwise. You can make no distinction."

Mr. Leitch Ritchie says, "Its operation is mainly confined to cheap periodicals; and there it is still more a tax upon profligacy than upon knowledge, for the simple reason that the circulation of those periodicals which pander to the tastes of the vulgar and depraved is vastly greater than that of the respectable periodicals."

Mr. T. Tate says, "Yes."

### 6. Does it affect the independence of their tone, or the quality of the matter which they contain?

Sir David Brewster says, "The quality of any article must be deteriorated when a tax adds to the expense of its production. The quality, both moral and intellectual, must suffer."

Mr. C. D. Collet says, "The quality of the matter, but not (I think) the independence of their tone."

Mr. Charles Dickens says, "Certainly not, as I conceive."

Mr. Angus B. Reach says, "Not, I think, directly. The operation of the pressure in the commercial department may not necessarily affect the independence of tone, but I think it does directly and necessarily affect the quality of matter. Independence of tone is a moral quality, but the question of literary merit is another thing. Everybody can be independent, but not every one can put his independent opinions well upon paper, so as to raise the quality of the contents of the journal for which it is intended."

Mr. Leitch Ritchie says, "Government is severe in its restrictions upon women of the town, and it makes no scruple of arresting a man who is *suspected* of loitering about with the intent to steal; but it looks calmly on while the whole country is saturated with printed incentives to felony and prostitution. This is not a question of the liberty of the press, it is a question of police, and unless a strict surveillance is to be exercised over the baser periodicals, the withdrawal of the duty would, in my opinion, be highly improper. If we dislike the name of a censorship, let the surveillance be termed a police inspection, and let it extend over all serials and periodicals, with the exception of political newspapers, published at a price not greater than one shilling per volume or twopence per number. Few persons are aware of the injury which the supineness of Government occasions to the respectable portion of the press. The poorest adventurer, if he only bids high enough in obscenity and in the laudation of robbery and murder, finds no difficulty in obtaining credit when commencing so sure a game, and is soon able to defy the wealthiest capitalist in the trade. If this unholy competition were at an end, the rivalry would be as regards taste and talent, and industry and experience would meet their due reward."

Mr. T. **Tate** says, "In a certain sense it does."

### 7. Please to state any facts relative to the above, or any other points bearing on this inquiry.

Sir **David Brewster** says, "Many works of great ingenuity and value are prevented from being written and published owing to the tax upon paper, and also fewer printers, paper-makers, and book-binders, are employed."

Mr. C. D. **Collet** says, "The best exposition of this subject will be found in two pamphlets by Mr. Charles Knight."

Mr. **Babbage** says, "I did not consider my knowledge of the details of the manufacture of paper to be sufficient to justify me in giving an opinion. Upon the economical opinion as to the effect of the Excise on paper, or on any other article, I knew that there would be no doubt, except amongst *practical men;* and I knew that the Society contained among its members many more able than myself to refute such fallacies. It appeared to me that the great object of these questions was to ascertain what impediments could be removed from the diffusion of printed knowledge. Holding myself the strongest opinions as to the advantage of disseminating knowledge, and believing that there exists a much greater impediment than any there adverted to, I did not think it necessary that I should press my view of that question, uncalled for, upon the Society. The question I allude to is the excessive cost of agency in transmitting the manufacture of the author to the consumer; that is, to the public."

Mr. **Charles Dickens** says, "The duty on paper is a considerable deduction from the profits of any periodical publication, and I suffer considerably from it in the case of *Household Words*. But I make that journal as good as I can, and if the duty were taken off to-morrow, could make it no better. Neither would it be possible to reduce the price of it to the public. I should put more money into my own pocket, and should be very glad to do that; but I cannot honestly say that I believe the heavily-taxed public would derive any benefit from a process so very agreeable to myself."

The Right Hon. T. B. **Macaulay**, M.P., says, "I have never paid the smallest attention to the details of the book trade, and am quite unable to answer, from my own experience or observation, any of the queries addressed to authors. I have a strong general impression that the paper duty and the machinery by which it is collected obstruct the progress of a very beautiful and useful manufacture; and I heartily wish that the Chancellor of the Exchequer may soon be able to spare the revenue derived from this source."

Professor **De Morgan** says, "I do not feel able to give *evidence* from knowledge upon the details of your circular, as I have only that impression which all must have, that the duty on paper does produce evils of the sort described, and have not made any special attempt to ascertain the correctness of that impression. I will, however, make two remarks:—1. The independence and quality of periodicals, if affected at all by the duty on paper, are not influenced by it one-thousandth part so much as by the necessity of pleasing their supporters. Care should be taken not to deduce all possible evils from an obnoxious tax. The tracts of Hannah More's school used to point out in each one sin a breach of *all* the Ten Commandments; but this argument did not reclaim any offenders. 2. The grievance of the paper duty as a tax, will not move the Chancellor of the Exchequer, who knows that there must be taxes. But he may, perhaps, be made to see that the existing duty is like a stamp duty, with no allowance for spoiled stamps; all the spoiled paper pays duty. This is a real grievance, and one which is prevented in other things; as in the stamps, for instance. If it be impracticable, as it undoubtedly is, to levy duty upon the profitable use of paper, there is reason enough in this alone for some other choice of means of revenue."

Professor **Henslow** says, "I have had no opportunity of inquiring into the extent of the evils to which a tax on paper may give rise. Inasmuch as this tax must tend to increase the price of many books (if not of all), it probably acts as a check upon the diffusion of knowledge. But in many cases, the price of paper bears so small a ratio to the other charges of the press, that the effect of the tax can scarcely be felt in the price set upon the work published."

Mr. **Angus B. Reach** says, "I have really no facts of sufficient significance to be inserted in a paper of this kind, but I may be allowed to say, that I consider the paper duty, from whatever side it is viewed, to be one great, bad fact."

Mr. **Leitch Ritchie** says, "If some such arrangement as I have mentioned came into effect, the sole argument in favour of the duty—its pressure upon the profligate press—would fall to the ground; and no Government would be hardy enough to retain what would then be really a tax upon knowledge, and upon the advancement of the people in morals, civilisation, and refinement. The amount of the tax as regards cheap literature, of which an idea is given in my answer to Question 1, is too preposterous for anything but indignation or ridicule; and, in fact, as the producers of this literature, who are depressed and defrauded by its operation, include many of the best, most popular, and therefore most powerful of our living authors, it would not be submitted to."

Mr. T. **Tate** says, "Authors are too much at the mercy of publishers. If the paper duty were taken off, authors would be better able to publish books on their own account, and they would thereby receive a better remuneration for their writings."

Mr. **Tom Taylor** says, "I am really unable to answer these questions on the strength of any personal experience on the subject. The author, I apprehend, generally, can know nothing, by virtue of his employment, of the working of the paper duty. I have my own opinions on the subjects to which the queries relate, and they are against the duty; but they are founded on observations and reasoning independent altogether of anything I have come into contact with as an author."

## ON THE EDUCATIONAL USES OF MUSEUMS.

On Saturday afternoon Professor Edward Forbes delivered, in the theatre of the Museum of Practical Geology, the opening lecture of the autumn session of the Metropolitan School of Science, applied to mining and the arts.

The professor began by stating that the third session of the Government School of Science having commenced, and the duty of opening the courses having been assigned to him, he should avail himself of the opportunity to offer some remarks upon the leading and characteristic features of the Institution, considered as an educational museum, and to make some observations upon the instructional uses to which museums might be advantageously applied. The school of applied sciences here established was the only instance in Britain of an organized instructional institution arising out of a museum, and being maintained in strict connection and relation with its origin. This was not an accident, but an event contemplated from the commencement of the geological survey. It was an experiment on a considerable scale, with a great purpose; for with a limited, though rapidly improving, machinery, it was intended to advance educational aims, having a vital importance in their bearing on the future prospects of this country. It was an endeavour, by a state mechanism, to cast the seeds of science over the broad fields of British industry, not indiscriminately, but especially in those places where there was a good soil thirsting for their germination. Those who were appointed to be cultivators had a responsible duty and a noble task. They had a firm faith in the dignity of their work, and in the certainty of good results arising from it. This must be their reward, and with it they were content to labour patiently and earnestly to the best of their endeavours, hopeful of the approbation and co-operation, not only of their fellow-labourers in science, but also of all intelligent and patriotic Britons. The results, so far, of the teaching in this Institution had been in the main highly satisfactory. With the close of last session terminated the two years' curriculum of the students who entered the Government School of Mines in 1851. Since their studies were now completed, he might speak of them, not in the language of compliment, for there was no necessity for it, but of unmixed praise. He could say this, not only for himself, but for all his colleagues, and he was glad to record the delightful satisfaction they felt that a distinguished, scientific, and practical career was open to those who were lately their pupils, and whom they now numbered amongst their esteemed friends. He was happy to say that their services were appreciated and sought for, and they congratulated some on having already obtained honourable and lucrative posts, for which they had become qualified within those walls. The result was equally satisfactory as regarded the working-man, for the intelligent artizans of London had responded to the opportunity which was offered them by this Institution, and it was a privilege and a pleasure to all who witnessed the unmistakeable earnestness and intelligence with which they attended here on Monday evenings. The school also held out advantages to the officers of the public service, both in the army and navy. This opportunity was not neglected by those for whose benefit it was intended; at the same time, it was expected that more use would have been made of it. The officers who attended mostly belonged to the medical and engineering departments of the East India Company's service. Gentlemen of the military and naval professions were often in a position to contribute to the general advancement of science, which an attendance at the occasional courses of lectures in the museum would enable them to make the most of. It was also supposed that the opportunities for scientific instruction here held out would be duly appreciated by persons in the middle and higher walks of life. That anticipation had proved fallacious. The occult science of table-turning, which now occupied the place that astrology did in former times, was regarded by them in so serious a light as to prevent them directing their attention to the cultivation of the zoological, mineralogical, chemical, or biological sciences. When they considered the large class of so-called educated persons who, instead of being the supporters of true science, ran after such things, need they wonder at the success of public follies! Yet, if they applied to them the term unintelligent, they would give mortal offence. Nothing more clearly indicated the necessity of the State taking the initiative in the general diffusion of scientific knowledge than this fact. They commenced the present session under favourable auspices, as far as the most important class of students, viz., the matriculated, were concerned. Their resources, though still limited, were increased, and much benefit would be derived from the institution of a new lectureship—that of applied mechanics. The accession of so eminent a man as Professor Willis, who was to direct the course of lectures upon that subject, must be deeply appreciated by them all, as being a new source of strength to the Institution. Of the merits of Dr. Hoffman, who was appointed to the chair of chemistry, he would not speak in his presence, the more especially as he had served with them for some time, and they had had an opportunity of appreciating his talents. His predecessor, Dr. Lyon Playfair, now filled another post of great trust and responsibility, on the conduct of which would depend in a great measure the value of institutions conducted by Government. But though separated from this Institution as a lecturer, it would still have the benefit of his advice and assistance, as he still remained a member of their educational committee. The chief object of this Institution was the illustration of the mineral constitution and products of the British islands and their Colonies. This object—whether they considered the great benefit derived by their nation from mineral wealth, or the vast capital invested in the search after, and application of, metals, or the light thrown thereby on science—could not but be regarded as an estimable one by every intelligent man. To carry it out perfectly and completely would require far more space and means than they had at their command. The applications of mineral products to the useful arts were so numerous, that no attempt could be made to illustrate them fully within those confined boundaries. However adequately some departments were represented, in others their display was only sketchy and partial. Perhaps the most distinctive feature of the Museum was, that it was the visible evidence of the bearings and purpose of the geological survey of the United Kingdom. After the Government surveyors had done their duty as topographers, the Government geologists went over the ground with the object of delineating its mineral structure. They traced new lines on the original Ordnance plates, and new maps were thus constructed, and issued to the public at an expense corresponding to the cost of the fresh work and colouring. The men who superintended this work were required to be men of skill and training, and high scientific acquirements. Here there was no off-duty, for the head had to work as long as the eyes were open. There was one department in this building represented by three or four cases, to which he could not refer without deep interest—he meant the illustrations of colonial geology. In this, the metropolis of its world-wide state, there ought to be some adequate illustration of their structure and general products. Such a display would be an object of curiosity and interest to all; but it would be a source of valuable information to the intending and thoughtful emigrant—and all men were thoughtful, at least, before they emigrated. It was with feelings akin to shame that, from their shabby but not worthless display of Colonial products, he entire voured to impart instruction to several emigrants who came to seek information from the materials contained in the museum. All that was wanted was space, because there would be plenty of contributions, if they had only room to keep the specimens. Mr. Malcolmson had an excellent and judicious collection of Indian products, which might be had, and others had some further specimens which might be got for the asking. With regard to the educational value of museums, they could not alone and of themselves educate; but they could instruct the educated, and excite a desire for knowledge amongst the ignorant. The labourer who visited the British Museum was not so much struck by the extent and variety of what he saw as by the order and harmony in which the different groups were arranged. He thus saw that all objects, however small, had their value and meaning; and instead of regarding objects as useful, useless, or curious—the three terms to which his classification was confined—he began to view them in a new light, and the fields, and flowers, and the stones that surrounded him, began to excite a new interest within him. He acquired a new sense in the thirst for natural knowledge, whilst he lost the thirst for beer which tortured him of old. He became a better citizen and a better man; and if he had the requisite gifts from Nature, he might become a Watt, a Stephenson, or a Miller. One of the great advantages of museums was that they stimulated the observing powers,—a part of education which had been too long neglected. The education of the observing powers was quite a different thing from scientific and industrial instruction. The taste and reasoning powers were heretofore exclusively attended to. This was necessarily the case in the absence of any schools for the education of the observing faculties. There was no reason why instruction in the sciences and education of the observing powers should not be carried on together. Museums afforded the best text-books for this united education, but they required to be explained by competent teachers. This was the great difficulty heretofore, but now it was happily in course of removal by means of the Metropolitan School of Science. Museums were too often regarded in thei scientific aspect alone. They had an educational use also, the value of which must greatly depend on the perfection with which their contents were arranged. An educated youth ought to be able to instruct himself in a well-organized museum with facility and advantage; consequently, the officers who presided over these establishments had a responsible duty to perform in this respect. The noble invention of the Great Exhibition, which would prove a glory to the end of time round the name of one of the most enlightened of princes, pointed out to the people of this country the high importance and interest of an industrial collection. It was strange that, amongst a people so industrious in their habits, and so practical in their modes of thought as the English, such a collection was not formed long ago. But this defect was now in course of being removed, and libraries and museums, of which all sensible men now understood the importance, were beginning to be formed in many places. It was a question for consideration whether instruction by means of lectures should be connected with museums. Some thought that it should not. But this was to regard museums in their scientific aspect only. With respect to the British Museum, which might be viewed as a general index and cyclopædia of scientific reference, such an opinion might be correct; but, with regard to others, he was convinced, after much consideration of the subject, that museums, unless connected with a system of public teaching, were of little use. The lecturer then proceeded to refer to the provincial museums, and uttered some sharp observations on the mode of their getting up, and the defects of their arrangement, from which he excluded those of Ipswich, Belfast, Manchester, York, and Newcastle. He observed, that local Institutions of this class ought chiefly to aim at the illustration of the districts by which they were surrounded. But they all contributed to instruct and to interest; and every shilling granted by the State to public libraries and museums assisted in generating a crop of good citizens. Out of science and knowledge came charity, loyalty, patriotism, and love of our neighbour. Whilst the weeds of idleness and vice died away, sound knowledge brought civilization and peace. Few of the so-styled civilised nations deserved that noble epithet, except as contrasted with barbarous states. The admiration of physical prowess, the honouring of tinsel, and the public glorification of martial renown, were far too deeply engraven in the spirit of cultivated nations to permit the noble epithet "civilised" to be affixed to their names. The nobility of industry in all its grades, the labour of genius, the work of head and hand striving under the shade of peace, must be honoured by states and peoples before either could claim with truth to be civilized; till then they were no better than enlightened barbarians. Think how all Europe and half Asia were now for some months standing on the verge of barbarous war — how Christian nations, with hand on sword-hilt, stood ready with mutual distrust and well-grounded suspicion to guard or to strike. Think of what was worse—how the crime of ignorance festered in the by-ways of Christian lands; and then let them boast of civilization if they could. The arts, sciences, taste, skill, industry,—all seemed to rise up amongst them in spite of themselves. Like good spirits, they appeared by main force to establish themselves on earth, to struggle with and conquer us for our own welfare; and if monarchs, presidents, and states knew their own interest and that of their people, it was in these enlightened invaders they would confide. But he regretted to say that ambition and strife still remained sturdy demons, and continued to drain the treasures raised by industry and toil; and those who thought they had departed had but a limited acquaintance with the condition of mankind and the hearts of governors. He could not help hoping that the time would come when every town in Britain, even of moderate size, would be able to boast of possessing public Institutions for the education and instruction of its adults, as well as its youthful population—when it would have a well-organised museum, wherein collections of natural bodies would be displayed, not with regard to show or curiosity, but for the illustration of the analogies and affinities of organised and inorganised objects, so that the visitor might, at a glance, learn something of the laws of Nature—when each town would have a library, the property of the public, and freely open to the well-conducted reader of every class —when its public walks and parks would be made instructive in botany and its useful application—when it would have a gallery of its own, possibly not consisting of the most famous pictures or statues, but nevertheless showing good examples of sound art, examples in the history and progress of design—and, above all, the best specimens to be procured of works of genius by its native inhabitants who had deservedly risen to fame. When that good time should come, true-hearted citizens would decorate their streets and squares with statues and memorials of the great and good men and women who had adorned their province—not merely of kings, statesmen, and warriors, but of philosophers, poets, men of science, physicians, philanthropists, and great workmen. How often, in travelling through our own beautiful country, did they not feel ashamed of its towns and cities, when they sought for their ornaments and the records of their true glories, and found none! How ugly was the comparison that forced itself upon their minds between the conduct of their own countrymen in this respect, and that of the citizens of continental towns! A traveller need not go far through the streets of most foreign cities without seeing statues or trophies of honour, serving at once as decorations, and as grateful records of the illustrious men they had produced—reminding the old of a glorious past, and inciting by example the young to add to the fame of their native soil. His picture might seem a dream; but he had faith sufficient in England and Englishmen to believe that in the course of time it would come to pass. Had the foresight of the present crowned the imagination of an ancient Briton, he might have hoped for its realisation in another world, scarcely in this. But a simple belief in the probability of State and people advancing in intellectual aims and true civilisation, and working them out through the length and breadth of the land, was essentially too wholesome and compatible with the progress of Christianised human nature, not to find an embodiment in a coming reality.

## HOME CORRESPONDENCE.

### PATENTS.

SIR,—In considering the question of patents, meaning thereby monopolies of useful inventions for limited periods, we may set aside altogether the inventors themselves, save as a part of that public whose interest has to be discussed. The benefit to the patentee is only a contingency upon some larger benefit to be achieved for the public.

If we refer to authorities on the subject, the weight of authority must rest on the absence of all sinister interest, or the possibility of sinister interest. Two persons may be selected from the mass, as taking widely different views of the subject.

John Stuart Mill, the son of the historian of India, our foremost lógician, and political economist, engaged in pursuits wholly distinct from those of patentees, and only interested in obtaining for the public all possible advantages on the best terms, says:

> "If the system of patents were abandoned for that of rewards by the State, the best shape that these could assume would be that of a small temporary tax imposed for the inventors' benefit on all persons making use of the inventions. No limit can be set to the importance, even in a purely productive and material point of view, of mere thought. . . . . . Intellectual speculation must be looked upon as a most influential part of the productive labour of society."

Isambard Kingdom Brunel, the son of a mechanical contriver and patentee, known as the reputed author of the Block-machinery at Portsmouth, is an engineer, whose profession depends on mechanical repute, and who is known as one of the most acute witnesses before Committees of the Legislature, for the purpose of promoting or impeding railways. He is therefore in the position of a rival to inventors, and not himself needing patents to attain a specific standing. In his evidence before the Committee of the House of Lords he says:

> "I do not wish to express any opinion as to what might have been formerly the effects of patents, or whether they did originally encourage inventions or not. . . . I believe them to be productive of almost unmixed evil with respect to every party connected with them, whether those for the benefit of whom they are apparently made or the public. . . . A good invention now is rarely a new idea that is suddenly propounded or occurring by inspiration, but is simply some sensible improvement upon what was last done. . . . . The chances are that most masters would, if they saw it was a good idea, give the man a pound or a five-pound note; and the man the next day would be at work at something else; and you would have out of that man's brains an immensely greater portion of invention, and I believe he would get much better paid for it. I believe he would really make money, whereas now everybody acquainted with these men know that they lose money by it, and that an inventor or schemer is a poor man who is more likely to go to the workhouse than anything else. . . . . I do not believe that you would have the same class of men working at inventions, but I think it would be a great benefit to the public, and that the class of men at present called schemers, who I believe are a pest to society, would be got rid of; and I think that intelligent workmen would really turn out a good deal in the course of the year of what is good in the shape of ideas, and on the whole get well paid for it. . . . . I think you must draw a distinction between those who appear as inventors and the parties from whom the ideas have really proceeded. I think they come generally from men of observation rather than inventors. Circumstances attract his attention; he sees a result produced which did not occur to him before, and being an intelligent man, he sees how it may be applied: and some opportunity occurs by accident, by which he can apply it or suggest it to other intelligent men; and that is how the best inventions have come about. They have not been certainly through what may be called professional inventors. . . . . If there were no patent laws, I think a man would think over his invention a little, get it into a shape to do him credit, and then, if he had a good master, he would show it to him, and if he thought he could make anything of it, he would give the man a pound or two, which would be really earned instead of hundreds being dreamed of but never touched."

Mr. Brunel thinks, "that an intelligent workman who can invent would be paid more, and employed accordingly, like a clerk who writes a good hand as compared with one who writes a bad one." He contemplates the inventor as an inferior, to be set at work when required, and all "intellectual speculation" is out of the question.

Of the witnesses before the Lords' Committee on Patents, there are favourable, six lawyers, five patent-agents, seven engineers, three manufacturers, three professors, and Mr. Henry Cole, a Government officer,—total, twenty-five.

The unfavourable witnesses are, two sugar-refiners, two civil engineers, one barrister, one merchant, one lieutenant-colonel, and one member of Parliament,—total, eight.

Leaving now the question of authority, we come to the consideration whether or not it is advisable to stimulate material progress, or to leave it wholly to chance.

We may assume that the savage condition of mankind is not so desirable as that in which property is recognised. Even that low state of property in which a special hunting-ground belongs to a special tribe, is an improvement in the condition of mere individual savages. Yet, to a certain extent, even this kind of appropriation is an infringement of the natural claim which every individual human being has to his or her portion of the globe we dwell on in equal shares. But as society has to be the gainer by the stimulus of tribal property, the claim of the individual is merged in that of the general body.

As the tribes cease to be hunters and become herdsmen, pasturage remains to the tribe; but the cattle—*chattels*, become the property of individuals. This is the inducement by which

> "The skilful shepherd peels me certain wands."

In other words, improves the herds and renders them more useful to man.

As men increase in numbers, animals will not suffice for food; and digging and planting—the gardening and agricultural processes—commence. This necessitates property in land with an understood proviso, that somehow or other, those who have no land awarded them shall be enabled to get a portion of the produce of the land, either in the shape of "black mail," or in exchange for some useful things they can produce by handicraft; a proviso recognised in our modern Poor-laws, and formerly recognised by charities at the gates of religious houses; and which proviso could only be laid in abeyance by the possessors being numerous or powerful enough to disregard the non-possessors, leaving them to starve, and killing them off when caught pilfering,—precisely as the Dutch boers at the Cape of Good Hope are accustomed to deal with the Kaffirs or infidels. They take to the Hottentots as a species of useful slave essential for labour, but denounce all surplus humanity that will not work for them.

The true happiness of all human beings consists in sympathy, whether in rude and coarse things, or in those which are refined and elevated. But sympathies cannot well exist between people in a state of want, and those with their wants supplied; and therefore we may assume, that happiness cannot exist in a nation with many destitute individuals.

It follows, therefore, that the greater the amount of all things useful to man, the greater will be the general amount of happiness.

There are many things absolutely necessary; as food, fuel, clothing, and shelter, to prevent violence. There are many more things essential to induce a condition of refinement.

To produce the latter, inducements are needed of a more complicated kind than the mere supply of the bodily wants. People must have an inducement to work, both with brain and muscles. We must seek for motives in the passions of mankind. They may be summed up in the expression *love of power*, whatever may be the purposes to which the power is to be applied, whether benevolent or malevolent. Love of wealth and ambition are only varying forms of the love of power.

In former ages men have become priests, warriors, legislators, from love of power, attaching other men to them to do their bidding, either by force or persuasion. In former times the openings to wealth, the modern element of power, were few. In proportion as the power of acquiring wealth extended, new kinds of property were created. The term wealth was not confined to land and cattle. Men began to perceive that the true command laid on man by the Creator was not "to earn his bread by the sweat of his brow," but by "the sweat of the brain within the brow." The impulse was awakened to convert the powers of Nature to man's uses, and relieve him from the drudgery of mere unskilled labour. Leisure for the arts of refinement was thus given to many men without the necessity of holding their fellows in slavery, the process that was adopted by Greeks and Romans of old as their only means of luxury and leisure.

But in order to induce men to work at the arts, the same consideration was needed as for working at agriculture,—*Property in the fruit of their toil.* Thence arose the institution of trades' guilds, in which skilful men were encouraged to work at what were called "mysteries," by privileges confined to their own body, and continued by the pupils or apprentices they might choose to educate.

Patents, or limited monopolies, in consideration of knowledge in new and useful arts to be made patent or open to the public in lieu of secret "mysteries," were the next step.

Probably those patents, professedly granted for the public good, were in reality granted by corrupt governors for the sake of gain.

Be this as it may, inventors have come to be a class of men with class interests like most other classes. They are mostly men born with an aptitude for inven whatever may be the abuses practised by patente calling themselves inventors.

One objection made to patents is, that they grant a property in an idea to one individual, while fifty others who may have the same idea are debarred from using it.

But in answer to this it may be replied, that a patent for an original idea occurs but rarely. Most patents are for a particular phase of an idea out of one hundred or one thousand. For one application of a new idea there are probably one thousand improvements and modifications of old ideas. Embargoing one out of a hundred forms of an idea cannot anyhow injure the public.

But the monopolized form of idea may be an injury to individuals by depriving them of the use of it.

But so may any endowment of any kind, from land upwards. Those who inhabit almshouses hold places that others would wish to occupy.

But everybody could put the ideas in practice, if they were open.

Not so. There is more than the mere idea; there is much thought and planning for the form of the idea, and very much tedious agitation afterwards to persuade the public to adopt it.

But fifty people might be agitating at the same time.

Not so. People compete in existing things, not in foreshadowed things. That which may be rendered exact, is a subject for competitive calculation. The untried is a speculation shunned by all but the foreseeing. The proof of this is, that every original patent which turns out successful, is surrounded by a crowd of satellites. The patent is professedly granted to stimulate this foreseeing, and to create present progress.

But it may be said, people cannot help inventing.

Very true. But however pleasant it may be to broach new ideas, the mere promulgation does not get them into use; they are disregarded, till success as a money speculation calls attention to them. Now, as time and money must be consumed in getting them to this point, people will not trouble themselves in creating a property all their neighbours may divide gratuitously as soon as produced.

But people do make inventions without patents.

Yes, for the sake of ambition or benevolence. But these are mostly inventions that a man can produce without asking the assistance of his fellow-men. He can produce in his closet and come forth to astonish, which is very pleasant to ambitious minds. But we have few examples of benevolent inventors who work hard and consecutively at inventions, and go through the disagreeable process of agitating them, for the mere purpose of improving general trade.

But people who are manufacturers invent to improve their business.

Rarely. They, or those they employ, *contrive.* Inventions that change whole currents of operations are usually produced by lookers on, who have to work very hard to introduce them to unwilling capitalists. Capital is essentially conservative—it does not like innovation. The shipowner of this year dislikes the improved shipowner of next year. The inventor has to fight a hard battle, and not till he has fought it, and won it, do others take to it, and endeavour to snatch the prize from his grasp.

But it is alleged that inventors are like plants and animals, they are a phase of Nature. When the world is ripe for them, they are produced.

On close examination, it will more probably be found that it is the individual who, by the idea he makes known, excites the competition. But in any case, whoever can cause useful ideas to be forestalled twenty or fifty years is a very valuable benefactor to the community. The inventor-patentee morally sows the seed that the succeeding generation reaps.

But inventors are schemers, needy men, a pest to themselves and the public.

Everybody doing anything new is a schemer, a speculator in the "to come." Insurance-offices for life and fire, railways, and all other joint-stock companies, are not got up by men with a plethora of wealth. The schemers are the absorbers of capital for new and useful objects; if they were rich men, probably they would not be so industrious. And were the law of partnership altered, so that capitalists might invest small portions of their property in new schemes without endangering the whole, many an inventor with a good idea would find an idle capitalist to help him to add to the general wealth of the community.

But after all, the patent is of no use to the inventor; his monopoly, if successful, only excites cupidity, and he is plunged into numerous lawsuits, that absorb all his gains.

Possibly this sphere for plunder may assist in preventing sharks from making inroads on real property. But this evil is not the fault of the patentee, but of those who make the laws. If a property be conferred on him, it is but just that the law should afford a simple means of protecting his property. With the will, the way would be easy.

But after all, would it not be better to let invention take its chance, than to protect individuals? The public is not bound to give a premium. The fifty or a hundred with the same idea would, some one or other, work it out without the patent.

This would not be wise. All that a patentee could individually get would be a mere fraction of the benefit to the community; and it is a wise thing to provide good prizes in a peaceable way for enterprising men of genius. The spirit that prompts invention would fructify in many branches. If the avenues to distinction and power were all closed, and their positions rendered permanent to existing occupants, to the exclusion of new comers, the chances are that they would not be too permanent. Compensation would be found in some irregular manner for the spirits denied the use of their legitimate sphere. Patents are one of the several modes whereby people rise from a condition of lowliness and climb ambition's ladder, and thus keep up the balance in the community,—the circulation of ranks instead of the principle of castes.

But the granting a patent does not always ensure the benefit to the public. Some patents are taken with a view to prevent the use of an invention: and capitalists may become possessed of them, and quash them for private interest sake.

These difficulties may occur, but they are not very common; and the law might easily provide a remedy by throwing open patents wilfully obstructed, or restoring them to the inventor in case of oppression upon him by unfair dealing.

But even supposing the inventor to have discovered something useful, does it follow that he is the man best fitted to get it into use in actual business or production?

Perhaps not directly, but indirectly, he does by incessant agitation. The capitalist embarked in a specific manufacture, or machine-acture, has very commonly a conservative tendency. He preaches the doctrine of finality. He would keep the public funds at what he calls "natural interest," 5*l*. per cent. for ever. He would ennoble his name with his mill, and cause it to descend in a right line for ever. He dislikes and hates the inventor whose elastic mind disturbs all this gravitation to fixed points.

It is impossible to lay too much force on the desirability of extending as widely as possible the sphere of individual distinction and power, even for the sake of the capitalists themselves. They would sink into stagnation, competing with each other in low prices till they brought machine-acture to as low a rate of interest as the funds They would destroy the whole energy of the community. There needs the wholesome condition, for the safety and progress of a state, that all energy and genius should be usefully employed, and not repressed. There are two processes by which people rise from the ranks to become persons of wealth—by incessant drudgery, combined with saving, and the repression of all the nobler qualities; or by the operation of original minds. The original mind is a *property* given by Nature. If this original mind be resident in a workman in a factory, without any possibility of securing a property in his ideas, with nothing to depend on but the liberality of his employer, the chances are that the usual consequences of irresponsible power will ensue. He will have to sell his birthright for a mess of pottage. His skill, his name, his ambition, and his genius will all be sunk in the 1*l*. or 5*l*. which his employer may—if a good master—bestow upon him, or which he may withhold if it so pleases him. Now, if we imagine a wealthy man, of narrow mind and low ambition, in the position of employer, he would permit no ideas to expand save such as might be conducive to his own profit; and he would take care that all the gain, whether in money, or repute, or power, should concentrate in himself. This would be like ashes on the inventor's mouth, and he would cease to invent. The stimulus would be gone, and he would turn to other things in which he might have scope to rise to the level of his capacity. Take away the protection of the patent, every new process worked out by originators would be watched by unscrupulous neighbours, who would rush at the plunder, when worth taking, as vultures at a quarry,—of which the state of pattern stealing amongst manufacturers has been an example.

The countries where patents have most flourished are England, the United States, and France. Patents are taken out in England by natives of all civilized communities; and England is at the head of civilization. The *property* in the fruits of the brain, as well as the brains themselves, has had something to do with this.

Switzerland never had patents; but her division into Cantons, constantly in disputes from religious or other causes, may well account for this apparent anomaly. A patent for a single Canton could not well be a protection.

The suggestion of driving out inventors from the field by the denial of patents for protection, and thus penning up invention amongst workmen, to be remunerated by 1*l*. and 5*l*. at the benevolent discretion of their employers, is ingenious; but like the contrivances of Abel Handy, in the play, would probably not work well. One result might safely be predicted—the great body of inventors would make the United States their sphere of action and their skill and energy would be directed to upraise still higher our chief rival in all that concerns national power. The progress of England would receive a sensible check, not in the first few years, but in gradually getting ten to twenty years behind the "smartest nation in creation."

This subject of patents does not concern England alone. It is a question, at least for the English world—not now bounded by the "four seas," but reaching wherever the English language is spoken. America is entitled to be heard at the bar. In the matter of mutual copyright in books she has retraced her steps—*it did not pay;* and depend upon it, her men of genius, who aid in her national progress, will have a fellow-feeling with those of the "Old country." They will agitate there and here for such laws as may help forward general progress. The abolition of patent laws here would be a signal for a general pillage of American inventions, to undersell them in the market of the world, when the patterns had been produced.

Inventors, broadly considered, are pattern-sellers, and pattern-sellers must ever be a highly-paid race. They pluck the tree of knowledge—of good, not of evil—and enable all to eat thereof.

With regard to the use of new ideas, that is, the putting in practice new principles, the profit is usually but little. The second growth, improvers and contrivers, usually reap the reward. It is probable that every succeeding year will behold changes of old things for new, and the rapidity with which the new supersede the old is *primâ facie* evidence of their importance. The premium to the inventor is in no case more than the shadow of a shade of the total value to mankind.

But it is conceivable that the patent privileges conferred for new things may be very seriously objectionable to those sitting in the seats of actual power, because they may bring forth new men with newer powers to take their places. The patent is the vantage-ground which, to the man of genius and conduct, is what the first-saved 100*l.* is to the mere man of business.

When the forthcoming catalogues of patents shall be produced, a large portion of litigation arising from uncertainty will be put an end to, and the number of new patents will be much lessened by people knowing what has been done before. The evils of patents are not inherent in the principle, but in the haphazard defective modes of legislation concerning it.

I am, Sir,
Yours faithfully,
*October 3rd*, 1853. COSMOS.

## ON THE IMPROVEMENT OF LEATHER.

SIR,—A leading article, referring to my patent process of converting skins into leather, appeared in the *Gardener's Chronicle*, which you and the editors of several newspapers have copied, and which I cannot permit to pass unnoticed, in particular as I have the honour to be on our Society's Standing Committee for Leather, &c., as my silence might be considered an approval of all that is therein stated; and especially of the opinion that oak-bark will be very much depreciated, and in future not be worth stripping off the trees, which appeared to me like irony when I first read it, as the quantity of leather which I manufacture is so small in proportion to the general produce of this country, that even supposing that the pressing demands of my customers for larger supplies should gradually be the cause of an extension of twenty times the present produce of my small factory (which is more than I expect), the quantity made would hardly be one-sixtieth portion of the total requirements, and an immense supply of tanning materials would still be wanted, for which tanners have not to look only to the owners of oak-trees in England, as the article in the *Gardener's Chronicle* appears to state, but are now, and will continue to be, dependent upon an annual importation of about 250,000 cwt. of oak-bark from Belgium and Holland, 120,000 cwt. of different descriptions of bark, and 750,000 cwt. of substitutes containing tannic acid; such as terra japonica, cutch, gambier, sumach, and valonia, from other countries.

All these articles have very much increased in value during the last few years; and leather tanned in foreign countries has also been imported in large quantities, as there is not sufficient made here for the demand. Of all the manufactures of this country that of leather is considered the fourth in importance; and the annual value of the leather manufactures was estimated some years ago at 14,000,000*l.* sterling. No doubt it is more at present, and is going on increasing; it is therefore my opinion that owners of oak trees in this country, and the importers of tanning materials from foreign countries, have no reason to apprehend any reduction in the demand; and that an enlarged manufacture of leather, even if carried on without the use of bark, or the substitutes hitherto known, will not injure any classes of producers or manufacturers, and will prove a public benefit.

I abstain from any remarks regarding the qualities of my new leather; it has worked, and will continue its own way in the estimation of those who use it for different purposes.

I remain, Sir, yours faithfully,
C. A. PRELLER.
Lant-street, Borough, Oct. 5, 1853.

## PROCEEDINGS OF INSTITUTIONS.

BEDFORD.—The Winter Session, at the Literary and Scientific Institution, was opened with two Lectures "On Popular Illusions," by Professor Partington, which were delivered on the evenings of Tuesday the 27th, and Wednesday the 28th of September. Mr. W. Blower, one of the Vice-Presidents, presided. On the following evening, the 29th ult., the Half-yearly general meeting for the election of officers, was held, when the following gentlemen were chosen as Members of the Committee for the ensuing year: Messrs. Sergeant, Usher, Ballard, and Roberts. Mr. White, one of the Committee, referred to the increasing demand for good books, and moved that a special meeting be called to consider a plan for enlarging and enriching the library.

BRIGHTON.—The opening Lecture of the Autumn Course, in connection with the Athenæum, on "English Music, and English Musicians," was delivered in the Town Hall, on Wednesday evening, September 28th, by Mr. Thomas Williams, assisted in the vocal illustrations by Miss B. Williams, and Miss Julia Bleaden; Mr. F. Osborne Williams presiding at the pianoforte. Mr. Williams reviewed the musical characteristics of our principal English composers, illustrating their respective styles by the selection of some of their best songs, duets, trios, &c., plentifully interspersed with anecdotes. He analysed the present state of English music, and showed the great advances that had been made during the last twenty years.

DEVONPORT.—The members and friends of the Mechanics' Institute were gratified, on Monday evening week, with one of the most enterprising efforts that was ever associated with the management of these popular Institutions; and the result of the enterprise was such as to prove that the boldness of it was not only unattended with loss, but likely to prove permanently beneficial to the Society. The occasion was an engagement of Madame Grisi, Signor Mario, Madame Doria, Madame Dreyfus, Signor Ciabatta, and Mr. J. L. Hatton, who gave a grand concert on the opening of the session; the programme comprising several English ballads, as well as Italian and German airs. The prices were so arranged that the concert should be accessible to all, and the result was, that even with low prices, the receipts more than covered the expenses; and, what is of perhaps greater consequence, the Institute has gained 193 additional subscribers since the first announcement of the concert. Between the first and second parts, Mr. R. Burnet, the founder of the Institute, who occupied the chair, addressed the audience; enumerating a few of those who by means of the instruction they had received at the Institute, and by their perseverance and industry, had raised themselves in the world. He said, when the Institute was first established, a shipwright apprentice came and paid his two shillings for a quarter, or his two pence a week. He offered himself as "the gratuitous librarian;" he was accepted, and filled worthily the office. By perseverance and study he was soon promoted, and was subsequently appointed to a most lucrative position, as master shipwright, in India. When that establishment was broken up, he returned to England, and was appointed to the same position in the Devonport Dockyard. His name was Turner. We had next a young shipwright apprentice, who was fond of drawing boats and ships: he became the teacher of others, and he now fills a situation in Somerset-house, the highest of his class. His name is well known as Mr. Thomas Waterman, a man who has constructed more steamers and ships than any man in England; but his plans have not been confined to Government ships.—The next name he should mention was that of Mr. Paterson. He came from a distant town; he was fond of sketching, and taught others: now his portraits are well known, and he seems to have caught the spirit of Sir Thomas Lawrence.—About this time a young man made an application to take home Rees' "Encyclopædia," but it being against the rules of the Society to separate large folio works, and he being very earnest, an especial meeting was called, and permission given him to take the volume home. This laid the foundation of his future fame. He is now the justly celebrated astronomer, who calculated, by anticipation, the ways of Divine Providence, in foretelling the appearance of a new planet. Need he say that his name was Adams?—The last was a watchmaker's apprentice, who had often delighted and much informed the members and friends of this Institute, but not upon the subject of clocks or watches. His knowledge of the sciences seemed to be universal. He it was who improved the system of great circle sailing, though he was not the originator of it. Mr. Towson, for that was the gentleman alluded to, had shortened the distance to Australia by twenty or thirty days each voyage.

## MISCELLANEA.

CLARKSON'S LIFE-BOAT.—Recently some trials were made at Dover to test the value of this invention. The boat was manned by eleven men, independent of the patentee and a gentleman named Trott. The boat having put to sea, the men, first securing the plugs, commenced filling her with water by means of a bucket; and when filled, the sail was set. The weight of water, however, had not any effect upon the boat, and she maintained her position apparently without sustaining the slightest detriment. The crew then rocked her, and endeavoured by every means to sink her. This was also unavailing, and she still sailed as buoyant as before. On the following day Mr. Clarkson gave some additional experiments with his captain's gig, a smaller boat, but made of similar material, and on the same principle as the life-boat. The boat was pitched off the pier into the sea by several men, but instantaneously righted, and relieved herself of water. Several tests were then tried upon her, and among others she was turned over, keel upwards. This was not effected without difficulty, but she turned into the proper position immediately.

RAILWAY ACCIDENTS.—Mr. Neison, who has paid much attention to railway statistics, has calculated, that if a person were born in a railway carriage, and were to be continually travelling on railways, day and night, till he was killed by an accident, he would, according to the average number of passengers and deaths, live 960 years.

MEASUREMENT OF THE MERIDIAN.—It has been announced that the Russian Government is about to have measured the degrees of the meridian from the North Cape, in 72½° north latitude, to the mouth of the Danube, in 45° of the same latitude—that is, on a line which traverses Europe in its whole length, and forms about a fourteenth part of the entire circumference of the earth. This measurement will exceed, by three degrees, the largest ever before executed—that which the English carried from the Himalaya to the southern point of British India.—*Civil Engineer and Architects' Journal.*

MUSEUM OF ORNAMENTAL ART.—The collection of objects of art, which has been for some time open to the public at Marlborough-house, in connection with the Department of Science and Art, having lately received some important additions, the exhibition in its augmented form was open to private view on Saturday. Amongst the most interesting objects now for the first time exhibited, may be mentioned some curious specimens of Italian earthenware, and a variety of porcelain from the manufactories of England, Naples, Bavaria, Spain, and Holland. There are also some beautiful specimens of early porcelain from France, and in the collection of china there are, it is said, a thousand new pieces, the majority of them being extremely striking and unique. In the compartment which is adorned by Her Majesty's magnificent collection of Sèvres porcelain, is a variety of pieces of early English china, so arranged as to indicate the gradual progress which has been made in this branch of useful and ornamental art. The Oriental pottery has been subjected to an entirely new arrangement, and its present classification renders it one of the most important and instructive features in the museum; whilst the Venetian glass, which is displayed in close proximity to it, is especially remarkable for its beauty and antiquity. The works in ivory, horn, and bone, mixed materials, basket-work, and marble, have also received some valuable additions; whilst the jewellery and enamels on metals have been so far augmented and improved, that they now enter very largely into the most important and attractive feature of the exhibition.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 30th September, 1853.*

*Dated 1st July, 1853.*

1585. J. Getty, Liverpool—Ship-building.

*Dated 20th August.*

1948. W. Vaughan, Stockport, and J. Scattergood, Heaton-Norris—Machinery, &c., for weaving.

*Dated 23rd August.*

1962. T. Herbert and E. Whitaker, Nottingham—Warp machinery for purled and other fabrics.

*Dated 9th September.*

2071. P. A. le Comte de Fontainemoreau, 4, South street, Finsbury—Consuming carbon escaping combustion. (A communication.)
2075. E. Lumby and Z. Sugden, Halifax—Needles used in carpet manufacture, &c.
2077. J. Martin, Faversham—Locks.
2079. J. L. Bell, Newcastle-on-Tyne—Sulphuric acid.
2081. C. M. T. du Motay and E. L. Duflos, 2, Rue Drouot, Paris—Bleaching fibrous substances.
2083. J. Childs, Gilston-road, Brompton—Manufacture of materials as substitute for mill-board, &c.
2085. E. A. Gouin, 110, Avenue de Clichy Batignolles, Paris—Improvements in looms, &c.
2087. R. Drew, Bath, and J. Bayliss, Birmingham—Stay and other fastenings.

*Dated 10th September.*

2088. W. C. Forster, 81, Hatton-garden—Manure.
2089. A. Warner, 34, Dorset-place, Dorset-square—Application of fibrous parts of palm-tree and leaf to arts and manufactures.

2090. J. D. Brunton, Truro—Apparatus for separating gold and silver from ores, &c.
2092. J. Grist, Islington—Stave jointing and shaping machine.
2093. E. Scragg, Buglawton, Cheshire—Steam-engines.
2094. E. Leyland, St. Helen's, Lancashire—Sulphuric acid.
2096. C. Jacob, 6, Ingram-court, Fenchurch-street—Manufacture of lime.
2097. R. Tronson, Chamber of Commerce, Liverpool—Ventilating and preventing spontaneous combustion in ships and other vessels laden with coal, &c.
2098. T. Metcalfe, 19, High-street, Camden-town — Portable chairs and tables.
2099. J. Webster, Ipswich—Treatment of oily and fatty matters for candle-making.
2100. J. Ward, Saville House. Leicester-square, and E. Cawley, 24, Stanley-street, Chelsea—Improvements in chairs, couches, &c.
2101. J. Marks and J. Howarth, Massachusetts—Machinery for operating brakes of railway carriages.
2102. J. F. Chack, Castle-street, London—Machinery for cutting veneers. (A communication.)

### *Dated 12th September.*

2103. W. Weild, Manchester—Lathes for cutting, turning, &c., wood, metal. &c.
2104. J. W. Child, Halifax, and R. Wilson, Low Moor Iron-works—Valves and pistons.
2105. J. H. Johnson, 47, Lincoln's-inn Fields—Transmission of motive power, substitute for the crank. (A communication.)
2106. E. R. Turner, St. Peter's Foundry, Ipswich—Grinding-mills for farm and other purposes.
2107. J. Lilley, jun., Jamaica-terrace, Limehouse—Mariners' compass.
2108. J. Maudslay, Lambeth—Boilers and furnaces for generating steam.
2109. J. Robison, Coleman-street, and W. Jackson, Leman-street—Consumption of smoke.
2110. A. V. Newton, 66, Chancery-lane—Printing-blocks and cylinders. (A communication.)
2112. C. Cannon, 27, Dance-street, Liverpool—Motive-power.
2113. A. V. Newton, 66, Chancery-lane—Machinery for crushing, &c., mineral substances. (A communication.)

### *Dated 13th September.*

2114. T. H. Ewbank, South-square, Gray's-inn—Manufacture of looped fabrics, and machinery for same.
2115. C. F. Adams and W. Gee, 23, Middle-street, Cloth-fair, London, and G. Davis, 8, Bath-street, Newgate-street—Lithographic and zincographic printing of words, &c., on metal, glass, &c., with or without intervention of paper or other flexible materials.
2116. H. Dubs, Vulcan Foundry, Warrington—Manufacturing iron or steel.
2117. A. Sington, Manchester—Machinery for setting doctors used in calico printing. (A communication.)
2118. A. Allan, Crewe—Locomotive and other boilers.
2119. J. H. Dickson, Evelyn-street, Lower-road, Deptford—Flax machinery.
2120. J. Behrens, Bradford—Manufacture of zinc. (A communication.)
2321. W. Smith, Little Woolstone, Bucks—Implements for tilling land.
2122. E. Goddard, New York—Machinery for cutting stone.
2123. M. Poole, Avenue-road, Regent's-park—Apparatus for removing matters or heat from currents of air, &c., and communicating the same. (A communication.)
2124. R. Laming, Mill-wall—Purifying gas.

### *Dated 14th September.*

2125. J. Wakefield, Inchicore Works, Dublin, and J. Baskerville, Dublin—Valves for reciprocating-engines driven by steam, &c.
2126. J. Wilson, Manchester—Machines for printing fabrics.
2127. P. Webley, Birmingham—Repeating fire-arms.
2128. J. Timmis, Stafford—Safety-valves.
2129. A. Wallace and G. Galloway, Glasgow—Portable furniture.
2130. J. J. G. Collins, Philadelphia—Steam-engines.
2131. J. H. Johnson, 47, Lincoln's-inn Fields—Sewing-machines. (A communication.)
2132. J. Higgin, Manchester—Burning fluids for obtaining heat.
2133. C. T. Hook, Tovil House, Maidstone—Manufacture of pulp.
2134. R. D. Kay, Bank-terrace, Accrington—Improvements in block-printing.
2135. M. Poole, Avenue-road, Regent's-park—Machinery for separating flour-shorts and dustings from bran, &c. (A communication.)
2136. G. Spencer, 6, Cannon-street West—Supporting rails, &c.
2137. J. Behrens, Bradford—Generating steam. (A communication.)
2138. T. Swingler, Victoria Foundry, Litchchurch, Derbyshire—Permanent way.
2139. W. Nash, Burslem—Manufacturing china and earthenware articles on the lathe.

### *Dated 15th September.*

2140. C. White, Pimlico—Blocks for block-printing.
2141. E. Edwards, Birmingham—Gas-stove.
2142. T. Browning, Pendleton—Machinery for washing, scouring, &c.
2143. H. Kraut, Zürich, Switzerland—Tools for boring rock for blasting.
2144. T. W. Keates, Chatham-place, Blackfriars—Distillation of turpentine.
2145. H. Hilliard, Glasgow—Apparatus for cleaning cutlery.
2146. L. F. H. C. Knuth, Old Bailey, London—Purses, cigar-cases, &c., &c.
2147. Dr. H. Jeanneret, Great Titchfield-street—Digging machinery.
2148. M. Poole, Avenue-road, Regent's-park — Distributing type. A communication.)
2149. S. Smith, Hyson-green Works, Nottingham—Governors for steam-engines.
2150. J. Barsham, Kingston-on-Thames — Bricks, tiles, and blocks.

### *Dated 16th September.*

2151. F. Higginson, 45, King William-street, London-bridge—Propelling ships.
2152. D. Mushet, Coleford, Gloucestershire — Steam-engine boiler and other furnaces.
2153. W. S. Icely, Bromley—Mechanical telegraphs.
2154. H. Meyer, Manchester—Looms.
2155. W. Carron, Birmingham—Signalling.
2157. A. Barclay, Kilmarnock—Arranging and working mining engines.
2158. A. Barclay, Kilmarnock—Lubricating shafts or revolving metallic surfaces.
2159. A. Thomson, and D. Lockerbie, Glasgow — Kilns for baking and burning earthenware.
2160. J. Adcock, Marlborough-road, Dalston — Apparatus for measuring distance travelled by vehicles.
2161. B. F. Weatherdon, Chancery-lane, and M. S. Hooper Sydenham—Railway-signals.

### *Dated 17th September.*

2162. T. E. Lilly, Birmingham—Carriages.
2164. J. Burton, Crawshaw Booth, Lancashire—Shuttles for weaving, &c.
2165. R Litherland and T. Picton, of Toxteth-park, Liverpool—Manufacturing brushes, and machinery for applying the same to polishing, cleaning, &c.
2166. C. Nickels and R. Selby, York-road, Lambeth—Flexible tubes and bands, and covering wire.
2167. H. C. Jennings, 8, Great Tower street—Bleaching resinous substances.
2168. Baron H. de Bode, 8, Albert street, Camden-road — Manufacture of wheels.
2169. R. A. Brooman, 166, Fleet-street—Manufacture of soap. (A communication.)

### *Dated 19th September.*

2170. E. Thomas, Belfast—Looms for weaving.
2172. W. L. Anderson, Norwood—Propelling ships, &c.
2173. J. Stevens, Richmand—Motive power by aid of air, steam, &c.
2174. T. Restell, Strand, London—Opening and closing ventilating louvres.

### *Dated 20th September.*

2175. S. Walker, Birmingham—Machinery for manufacturing thimbles.
2176. R. Fletcher and John Smith, Birmingham—Fire-arms.
2177. H. Walker, Gresham-street—Stopping vehicles on railways.
2178. J. L. Beloud, S. C. Beloud, and G. Guyatt, Greek-street, Soho—Shears.
2179. A. M. Servan, Philpot-lane—Distilling fatty and oily matters.
2180. M. Poole, Avenue-road, Regent's-park—Life-preservers. (A communication.)
2181. F. Potts, Birmingham—Manufacture of taper-tubes.
2182. W. Stockil, Long-lane, Surrey—New method of blocking leather.
2183. S. Neal, Manchester, W. B. Jerrold, Inner Temple, and C. Montgomery, Cornhill—Manufacture of casks and barrels. (A communication.)
2184. H. Needham, Wardour-street—Revolving fire-arms.
2185. J. Gibbs, Abingdon-street—Treatment of minerals for the purpose of separating impurities.

### *Dated 21st September.*

2186. G. Peabody, Warnford-court, London—Machinery for dressing and warping yarns. (A communication.)
2187. A. V. Newton, 66, Chancery-lane—Method of forming seams and ornamental stitching, and machinery for same. (A communication.)
2188. A. V. Newton, 66, Chancery-lane—Steam-boilers, &c. (A communication.)

### *Dated 22nd September.*

2192. P. R. Arrowsmith and J. Newhouse, Bolton-le-Moors—Spinning and doubling machines.

2194. T. W. Walker, Hangley, Staffordshire—Crates of wood for potters.
2196. S. A. Benetfink, Cheapside—Coal-box.

### APPLICATIONS WITH COMPLETE SPECIFICATIONS FILED.

2190. J. Baldwin, Birmingham—Making paper bags. 22nd Sept., 1853.
2209. C. F. Stansbury, Cornhill—Converting fine coal into lumps. 26th Sept.
2215. N. Callan, Maynooth College—Protecting iron against action of weather, &c. 27th Sept.

## WEEKLY LIST OF PATENTS SEALED.

*Sealed September 29th, 1853.*

743. James Webley, of Birmingham—Improvements in the construction of repeating or revolving and other pistols and fire-arms.
745. Thomas Hill, of Southampton—Improvements in springs, and also in the modes of their application to railway engines and carriages. (A communication.)
748. Robert Heath, of Betley, Staffordshire—Improvements in railway-breaks and signals.
749. Isaac Rider, of Bristol—Improvements in cocks for drawing off beer or other liquids.
750. Lawrence Frederick Keogh, of Liverpool—Improvements in looms for weaving.
755. John Pym, of Pimlico—Improvements in the permanent way of railways.
757. Julian Bernard, of Guilford street, Russell-square—Improvements in boots, shoes, and clogs, and in the machinery or apparatus and materials connected therewith.
769. Lot Faulkner, of Cheadle—Improvements in the method of obtaining motive power.
772. Robert McGavin, of Glasgow—Improvements in the construction of ships' masts, yards, booms, and in spars.
774. John Radcliffe, of Bradford—Improvements in looms for weaving.
788. George Robb, of Glasgow—Improvements in the manufacture of sulphuric acid, alkalis, and other salts.
791. Christopher Garman Rosenkilde, of Christiansand, Norway—Improvements in window-sash fastenings.
792. Frederick William Mowbray, of Bradford, Yorkshire—Improvements in doubling wool and other fibrous substances.
794. James Findlow, of Manchester—Improvements in beds or couches for sick persons.
797. William Beckett Johnson, of Manchester—Improvements in steam-engines and apparatus connected therewith.
800. George Henry Brookbank, of Crawley-street, Oakley-square—Improvements in horizontal pianofortes.
806. Antoine Burg, of Paris—Certain instruments, apparatus, and articles for the application of electro-galvanic and magnetic action for medical purposes.
817. William Pidding, of the Strand—Improvements in the manufacture of woven, textile, or other fabrics, and in the machinery or apparatus connected therewith.
821. William Pidding, of the Strand—Improvements in the preparation or treatment of twine or other threads, or cuttings of paper or other waste, for the production of useful and ornamental articles.
832. William Augustus Pascal Aymard, of South-street—Improvements in the preparation, and application to the manufacture of candles and other purposes, of certain fatty and resinous bodies or substances. (A communication.)
833. William Morgan, of Birmingham—Improvements in paper and cardboard cutting machines.
835. Frederick William Mowbray, of Bradford—Improvements in apparatus used in preparing and combing wool and other fibrous materials.
844. George Frederic Goble, of Great Fish-street Hill—Improvements in safety-valves for steam-boilers and gas-chambers.
853. Joshua Farrer, of Marsden—Improvements in the treatment of flax, line, grasses, and other fibrous substances.
855. George Frederic Goble, of Great Fish-street Hill—Improvements in machinery to be actuated by water or air.
862. Robert Bostwick Ruggles, of Patterson, State of New Jersey, and Lemuel Wright Serrell, of New York—Improvements in machinery for beating gold and other laminæ of metal.
872. Richard Archibald Brooman, of Fleet-street—Improvements in grinding and pulverizing gums, gum-resins, and other drugs, and articles of similar character. (A communication.)
922. Samuel Bayliss, of Old Broad-street—Improvements in consuming or preventing smoke and heating liquids.
1015. William Johnson, of Lincoln's-inn Fields—Improvements in machinery or apparatus for marking, ruling, or ornamenting surfaces. (A communication.)
1047. Oliver P. Drake, of Massachusetts, United States of America—A new or improved apparatus for vaporizing benzole, or other suitable hydro-carbon, and mixing it with atmospheric air, so that the mixture may be burnt for the purposes of illumination or otherwise.
1049. James Bristow, of Bouverie-street, and Henry [illegible] of Holland-street, Blackfriars-road—Improvements in the means of consuming smoke.
1122. William Longmaid and John Longmaid, of Beaumont-square—Improvements in treating waste products obtained in smelting and otherwise treating ores and minerals, and in producing a valuable product or products therefrom.
1151. John Henry Johnson, of Lincoln's-inn Fields—Improvements in machinery or apparatus for effecting agricultural operations.
1156. Marie Pierre Ferdinand Mazier, of Aigle, France—A machine for cutting and reaping corn, corn crops, and other plants.
1353. Richard Longden Hattersley, of Keighley—Improvements in machinery for forging iron and other metals.
1656. Andrew Burns, of Glasgow—Improvements in constructing iron ships, boats, boilers, and other metallic structures.
1697. William Edward Newton, of Chancery-lane—Improvements in machinery or apparatus for digging, excavating, and removing earth. (A communication.)
1698. Edmund Reynolds Fayerman, of Shaftesbury-crescent—A method of, and instrument for, keeping time in music.
1713. Richard Dart and Edward Silverwood, of Bedford-street, Covent-garden—The adaptation of loom machinery to the purposes of embroidery for badges worn by the police, railway officials, and other officers, and which require a succession of figures.
1738. Frederick Warner and John Lee, of the Crescent, Jewin-street—Improvements in water-closets and urinals.
1740. James Murdoch Napier, of York-road, Lambeth—Improvements in letter-press and other raised surface printing-machines.
1747. Robert Bitten, of Dartford—Improvements in apparatus for ascertaining and indicating the supply of water in steam-boilers.
1749. John Ferguson, of the Heathfield Brick and Pottery Works, Glasgow—Improvements in kilns for baking or burning clay.
1751. William Edward Newton, of Chancery-lane—Improved machinery or apparatus for stopping cables. (A communication.)
1775. James Edward McConnell, of Wolverton—Improvements in steam-engines and boilers for marine purposes.
1796. Robert Griffiths, of Mornington-road, Regent's-park—Improvements in the manufacture of bolts and rivets.
1814. Charles Frederick Stansbury, of Pall-mall—Improvements in machinery for tempering clay, and pressing or converting it into bricks. (A communication.)
1815. William Sargeant Roden and William Thomas, of the Ebbw-vale Iron-works—Improvements in [illegible] metals.
1847. William Edward Newton, of Chancery-lane—Improvements in horse-shoes. (A communication.)
1848. William Hickson, of Carlisle—Improvements in the application of heat for baking and drying purposes and in the generation of steam.

*Sealed 1st October.*

781. Henry Spencer, Henry Tattersall, and Hugh [illegible] all of Rochdale—Improvements in machinery or apparatus for preparing and spinning cotton and other fibrous materials.
786. Sir James Caleb Anderson, Bart., of Fermoy, Ireland—Improvements in locomotive engines.

*Sealed 3rd October.*

810. William Mavity, of Birmingham—A new or improved method of manufacturing letters and figures to be used as printing type, lettering for sign and [illegible] boards, and other such like purposes.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Oct. 1 | 3517 | A Stock ................................ | James Mellor ................ | 9, Chestergate, Macclesfield, Cheshire. |
| " " | 3518 | A Cravat ................................ | James Mellor ................ | 9, Chestergate, Macclesfield, Cheshire. |

# SOCIETY OF ARTS.

### FRIDAY, OCTOBER 14th, 1853.

## INSTITUTIONS TAKEN INTO UNION.

The following Institutions have been taken into Union since the last announcement:

289. Bury St. Edmunds, Athenæum and Suffolk Institute of Archæology and Natural History.
290. Cambo (near Morpeth), Subscription Library.
291. Odiham, Mechanics' Institution.
292. Clapham, Literary and Scientific Institution.
293. Sheffield, People's College.
294. Tottenham and Edmonton, Literary and Scientific Institution.

## INTERCHANGE OF PRIVILEGES.

The following Institutions have requested that their names may be added to the List of those agreeing to the General Interchange of Privileges, by which the Member of any one Institution, when visiting a town in which any other is situated, may enjoy at that other, for the time being, all the advantages of membership, subject, of course, to such conditions and regulations as each Institution may think fit to make. Secretaries of Institutions are particularly requested to correct, from time to time, from the notices which appear in the Journal, the Sheet-Lists of Institutions in Union sent to them a short time back, in which those are particularly marked that had agreed to the interchange:

Bath, Commercial and Literary Institution.
Bodmin, Literary Institution.
Bridgwater, Literary and Scientific Institution.
Camberwell, Institute for the Industrial Classes.
Clapham, Literary and Scientific Institution.
Corfe Castle, Mutual Improvement Society.
Hereford, Philosophical, Antiquarian, and Literary Society.
Leek, Mechanics' Institution.
Shaftesbury, Literary Institution.
Truro, Literary and Scientific Institntion.
Whitby, Institute.
Whitehaven, Mechanics' Institution.
Wimborne Minster, Society for the Acquirement of Useful Knowledge.

## STATISTICS.

The Circular and List of Queries proposed by the Society of Arts, 25th July last, with a view to obtaining correct information as to the actual condition of the Literary and Scientific Institutions and Mechanics' Institutes of the United Kingdom, have duly been responded to by about one-third of the whole number. Many of those which have been received have evidently been most carefully filled in, and considerable time must have been occupied in procuring the requisite information for the purpose. But unless a large proportion of the remaining two-thirds are returned, it will not be possible to publish a summary of the replies in that form which was at first intended, so as to show not only the actual extent and importance of these Institutions, but also their predominance in particular districts and counties, so as to enable some deductions to be drawn as to their usefulness in promoting and advancing education.

It is earnestly desired that those Institutions which have not yet made any return to the Queries in question, will do so with as little delay as possible, and not later than the 1st of November; and that the secretaries and officers of Institutions will also urge upon others in their several localities, or to whom they may happen to be known, the importance and necessity of making the returns by the time stated.

## EXHIBITION OF INVENTIONS.

Members and others, who intend to contribute to the Fifth Annual Exhibition of Inventions, are requested to forward their models, specimens, or drawings, on or before the 1st of November next, in order that they may appear in the Catalogue.

## INDUSTRIAL EDUCATION IN INDIA.

Whilst the subject of Industrial Education is exciting so much interest in this country, it is pleasing to find that its importance is recognized in other regions, and that it has been practically taken up with considerable success in Madras. That India presents a field peculiarly adapted for progress in this direction will be evident when we remember the display of her products and manufactures at the Great Exhibition of 1851. The excellence which was there displayed in colouring and design, by the almost instinctive skill of the natives, put to shame the efforts of the more educated artizan of this country; whilst, in many respects, the niceties of manufacture were sadly deficient, showing that if by education we could give a greater knowledge to the native on this head, the manufactures of India need fear comparison with no others in the world. So long ago as 1850, a School of Industry was established by the active exertions of Dr. Alexander Hunter. Soon after his appointment as surgeon, about the 1st of May, 1850, Dr. Hunter, entirely at his own charge, opened a School of Arts, with the liberal and enlightened design of creating among the native population a taste for the Fine Arts. This Institution has became the forerunner of a School of Industry in connection with it. The success which attended the School of Arts very soon suggested to the mind of Dr. Hunter to enlarge his plans by establishing in connection with it the School of Industry, for giving instruction in various branches of the useful Arts. This Institution, like the School of Arts, was originally set on foot by Dr. Hunter, at his own cost; but after a little while, finding himself under the necessity of obtaining some pecuniary help, to provide the necessary apparatus for the operations of the school, he appealed to the public, and so obtained a small contribution in aid of its funds; and at the same time he induced a number of gentlemen to consent to form themselves into a Committee, to assist him in its management. The Madras School of Industry was opened on the 1st of June, 1851, the object of its establishment being to afford to the rising generation of the country the opportunity and means of acquiring useful handicrafts, to improve the manufacture of various articles of domestic and daily use, largely made in the country, but rudely and uncouthly; and also by developing the latent natural resources of the country, to create a local supply of several articles in general demand, which had hitherto been almost entirely imported. A further object was more immediately allied to that of the School of Arts, viz., to improve the taste of the native public, and make them familiar with beauty of form and finish in articles daily in their hands and before their eyes. The result of the experiment has, notwithstanding the short period that has elapsed since the commencement of the school, been such as to afford very encouraging hopes of its success and usefulness.

The Committee, in a Report, dated March, 1852, state, that since the opening of the school, forty-four pupils had been under instruction, and that it then contained nineteen pupils, of whom they reported eighteen to be making creditable progress. The work on which the pupils had been principally employed was pottery. A ready sale appears to have been found for many of the articles manufactured, the orders received being indeed far greater than the school, with its existing appliances, could meet.

The various mineral products of the Presidency have been brought to bear in the manufactures effected; such as porcelain, earths and clays, gypsum, quartz, felspar, granites, steatite, corundum, magnesite, galena, manganese, plumbago, the ores of iron, and coloured earths. These and other products, either brought to light or discovered in new localities, and in greater variety by the same means, are likely to become articles of large and profitable export to England in their raw state, particularly, as the Committee state in their report, fine qualities of emery, and two or three qualities of corundum, chromate of iron, a rich ore of manganese, and another of antimony.

The School of Arts is closely associated with the School of Industry; indeed the two schools are intimately connected, and mutually dependent on each other; the success of the one materially contributing to the success of the other. It appears that the School of Arts opened May 1st, 1850, and the number of pupils who applied for admission was at once considerable, and in three or four months there were about 180 pupils, who willingly paid a rupee a month for instruction. Since then the numbers in Madras have gone on increasing till there was in March, 1852, nearly 300 youths, studying drawing, painting, or engraving in the original school, and in the two branch schools, which it became necessary to open in connection with the Vepery Grammar School and at the Military Male Orphan Asylum. These three schools now support seven East Indian and native masters, on monthly salaries of 70, 50, 30, 25, 10, 8, and 7 rupees; in addition to which a good many of the pupils are earning from 5 to 10 rupees a month by copying pictures, drawings, sketches, and assisting to illustrate periodical literature, for which the school is creating a demand.

The Third Annual Report of the School of Industrial Arts, dated July, 1853, states, that some important changes have taken place during the past year. The school has been entirely remodelled, "so as to adapt the system of instruction to the wants of the different classes of the pupils, who are becoming so numerous that accommodation could not be provided for all in one building." It appears too by the Report that the monthly charge of one rupee was too high; and that East Indian pupils were soon tempted to seek and obtain other employment, and had no difficulty in getting situations as writers. Native pupils appear to be too poor to pay for their instruction and to purchase materials, whilst, at the same time, there was an increased demand for qualified instructors; and orders for pictures and elementary lessons and copies were so numerous from Madras and other localities, that it was found impossible to execute them. Native pupils have not enjoyed the same facilities for obtaining employment as East Indian pupils, and the consequence has been that more steady progress has been observed, particularly among those of advanced years. "A good many of this class of pupils have devoted the whole of their time and attention to drawing, and some have spent from eight to ten hours daily in the school. The East Indian pupils have shown the greatest amount of assiduity, freedom, and boldness in designing and copying. The Natives have excelled in precision of touch, clearness and accuracy of outline (which may in some manner be attributed to their early familiarity with the practice of drawing mathematical patterns on the floors of their houses), and by their patience and industry they have acquired a more thorough knowledge of the rudiments of art."

It appears that the total number of pupils who have received artistic instruction in the school since its establishment has been 472, of which number a good many have been able to procure remunerative situations from their proficiency in drawing.

Native pupils, mentioned in the Report, have been selected as the best qualified to execute copies of the prize designs and of the studies in the school, for which there appears to be a demand in India.

The system of instruction in the school has lately been improved by confining the pupils to progressive lessons in the rudiments of a few branches—as geometrical and architectural drawing, ornamental designing from natural plants, botanical and landscape drawing. Desultory efforts in the higher branches of art have been discouraged. "The system of offering small monthly prizes for original designs from particular plants," says the Report, "has worked exceedingly well, and brought out many of our early pupils into the field as competitors, besides calling forth a great amount of native artistic talent, of which we had no knowledge. As a proof of this, sixty-two large designs from plants were forwarded to the school within six weeks from the time of advertising three prizes of ten, seven, and four rupees." "On another occasion, when two prizes of ten and seven rupees were advertised for the best collection of designs drawn by native women in front of their doors, nearly 400 patterns were forwarded, and many of them were remarkable for careful and most difficult geometrical drawing, as also for taste in the arrangement of colours."

The amount earned monthly by the pupils who have obtained situations for their proficiency in drawing, is stated to have amounted to 592 rupees.

These facts show that the arts are beginning to be appreciated in India; and if there were proper facilities for educating pupils, they would have no difficulty in obtaining remunerative situations. The Report states, that the results of the Committee's "labours in the industrial department have been very satisfactory, though a great deal more might have been accomplished had skilled artizans and more ample funds been available. It may be as well to mention, that this branch of the school was commenced for the purpose of trying to point out the practical application to the arts and manufactures of a few of the raw materials which are abundant and cheap in India."

With the small sum of 2,000 rupees it could not be expected that anything like an efficient manufactory could be set on foot.

The Committee therefore resolved, "that as soon as any branch of industry promised to be lucrative, or held out a fair prospect of being taken up by private enterprise, encouragement should be given to the public, or to private individuals, to enter into the field."

Three branches of industry which have been taught in the schools have been thus taken up, and it is said each promises to be remunerative. The first branch was the making of paper, and various native sources of raw material, such as the aloe, plantain, and others, were made use of with success; but the experiments have since been taken up by a wealthy native, who has imported European machinery, and he has been very successful. Samples have been forwarded to Kew and Edinburgh.

The native raw materials used in the manufacture of paper soon attracted the attention of the mercantile community as being adapted for cordage, and samples have been prepared which hold out considerable promise of success. It appears, however, that the fibre from the aloe is the only one which approaches the strength of European and Russian hemp.

The next branch attempted in the school was the manufacture of pottery. "The orders in this department," says the Report, "have been far more extensive, and would prove highly remunerative if the work could be turned out with rapidity, regularity, and certainty; but unfortunately a great deal which was good at the first, or biscuit firing, has been completely spoiled in an attempt to perfect the glazing."

The process has been worked solely from books; and there is no doubt that if proper European instructors could be obtained, the difficulty could be readily overcome.

The Report adds that, "Another satisfactory result of their industrial labours has been the discovery of a variety of raw materials from the vegetable and mineral kingdoms, suited for employment in the arts and manufactures of them,—the most important have been good woods for engraving, carving, decoration, and useful purposes; a few vegetables, and a great variety of mineral colours — extensive beds of clay, and materials for every variety of porcelain, pottery, glass, and enamel; several materials in great abundance—marbles, lithographic stones, and grindstones of every quality, gypsums, selenites, and cement stones; and lastly, corundum and emery in a number of different localities. * * * * large and remunerative orders have been received for them; but one or two other substances of no value are so easily mistaken for them, that care and scientific knowledge are required in their selection."

It appears that the East India Company have sanctioned a grant of 6,000 rupees for the use of the Institution; and it is hoped that the increased encouragement which the arts are thus receiving in India, may prove a guarantee for further liberal support on all sides.

The Committee, in a letter addressed to the Chief Secretary of the Government at Madras, thus state their views:

"In conclusion, we think it right again to explain our views as to the true province and design of this Institution, with reference to the remarks of the Honourable the Court of Directors, as to the prospect of the schools becoming eventually independent of Government aid, a point which they consider indispensable. We submit that the great object to be aimed at, and to which other Institutions of the same character are directed, is not the effecting of such profits as to render them remunerative, but by shewing the feasibility of various objects to open up a way into which private capital may be profitably diverted—like the Institutions in Europe above alluded to; their province is not commerce, but science, though only such science is pursued as is calculated to promote commerce: while therefore we see no reason to doubt that sufficient remunerative work would be accomplished to meet in part the pecuniary liabilities of these Institutions, we do not expect, nor would it be consistent with their character and design to expect, that they will prove so far remunerative as to become independent of extraneous support. To repeat the concluding observations of our former letter, we do no anticipate that these Institutions will be themselves money-making establishments; but we do anticipate that they will show how money is to be made. The legitimate province of these schools will be in the first place to experimentalise; and then when the experiment has succeeded, not to monopolise the manufacture so produced, but leaving it to be taken up by private capital, and private enterprise, to pass on to some other branch of manufacture. In a word, we regard these Institutions as likely to become useful pioneers, pointing out the road to various fields of remunerative labour, clearing away the obstacles that obstruct it; and by leading the way, encouraging a class too prone to regard handicraft operations as degrading, to enter upon a sphere of honourable, manly, useful, and profitable exertion."

## CHEMISTRY AND PERFUMERY.

It will be remembered that Dr. Playfair, in his lecture "On the Chemical Principles involved in the Manufactures of the Great Exhibition," adverts to the fact, that "some of the most delicate perfumes were made by chemical artifice, and not, as of old, by distilling them from flowers." He goes on to state that perfumes thus prepared were sent to the Exhibition, and that "singularly enough they are generally derived from substances of an intensely disgusting odour. A peculiarly fœtid oil, termed 'fusel oil,' is formed in making brandy and whisky." "Putrid cheese," a "soap made with butter," "the fœtid oils of gas-tar," and "the drainings of cowhouses," are those stated to be the main source to which the manufacturer applies for the production of his most delicate and admired perfumes. Professor Fehling, in the Wurtemburg *Journal of Industry*, gives an abstract of what is at present known respecting the composition of some of these artificial essences. The following is a description of these extracts, and of their manufacture:

*Pine Apple Oil.*—This product consists of a solution of 1 part of butyric acid ether, in 8 to 10 parts of spirits of wine. For preparing butyric acid ether, pure butyric acid is required, and this is obtained most readily and in greatest quantity, by the fermentation of sugar, or of St. John's bread (*siliqua dulcis*). For preparing butyric acid from sugar, M. Bentch takes a solution of 6 lbs. of sugar and half an ounce of tartaric acid in 26 lbs. of water, which is left to stand for some days; at the same time about a quarter of a pound of old decayed cheese is diffused in 8 lbs. of sour milk, from which the cream has been removed; and after this has also stood for some days, it is mixed with the first solution, and the whole is kept from four to six weeks at a temperature of about 24° to 28° Reaumer, water being added from time to time to replace that which is lost by evaporation. After the evolution of gas has entirely ceased, the liquid is dissolved with its own bulk of water, and finally 8 lbs. of crystallized soda, dissolved in 12 lbs. to 16 lbs. of water, are added to it. The liquid is then filtered and evaporated till it weighs only 10 lbs., when a quantity of 5½ lbs. of sulphuric acid (*nordhausen*, or fuming sulphuric acid), diluted with 5½ lbs. of water, is carefully mixed with it by small portions at a time. The butyric acid, in the state of an oily substance, will now appear on the surface of the liquid, from which it may be skimmed off; but as the remaining liquid still contains some butyric acid, it is submitted to distillation, by which means another portion of diluted butyric acid is obtained, which may be concentrated by means of melted chloride of calcium, or by saturating it with carbonate of soda, evaporating and decomposing by sulphuric acid. By this method 1¾ lbs. of pure butyric acid are obtained from 6 lbs. of sugar.

M. Marsson says that the same product may be obtained from St. John's bread (*siliqua dulcis*), by taking 4 lbs. of mashed St. John's bread, and mixing it with 10 lbs. of water and 1 lb. of chalk; the liquid matter must be maintained from three to four weeks at a temperature of from 25° to 35° Reaumer, and be often and well stirred, and from time to time the water that has evaporated must be replaced. After fermentation has ceased, a quantity of water equal to the bulk of the liquid is added, and afterwards a concentrated solution of 2½ lbs. or 2¾ lbs. of carbonate of soda, when it is finally evaporated. To the concentrated liquid is then added 1½ lbs. to 2 lbs. of sulphuric acid, diluted with 2 lbs. of water; and the remainder of the process is performed as already described. By this method a little more than half a pound of coloured butyric acid will be obtained. The acid, however, retains a peculiar smell from the St. John's bread, which continues even in the ether prepared from the same; whereas that prepared from sugar gives an ether of a very pure smell. It will be found advantageous to agitate the oily butyric acid with chloride of calcium, in order to deprive it entirely of its moisture.

For preparing butyric acid ether (butyrate of oxyde of ethyle) from butyric acid, 1 lb. of butyric acid is dissolved in 1 lb. of rectified alcohol (95° Tralles), and is mixed with one-half to one-fourth of an ounce of concentrated sulphuric acid; the compound is heated for some minutes, when the butyric acid ether will form a thin layer on the top. The whole is then mixed with half of its bulk of water, and the upper layer taken off; the remaining liquid being submitted to distillation, yields another quantity of butyric acid ether, which is mixed with that obtained in the first instance, and the whole well agitated with a very diluted solution of soda, in order to deprive it of all the acid; which operation should be repeated several times if a very pure ether is desired to be obtained. Care should be taken to use but small quantities of the diluted soda solution at a time, so as not to lose too much ether, this latter being in some measure soluble in water. When large quantities are to be acted upon, the washing water (*eau de lavage*) is collected, mixed with an equal volume of spirits of wine, and distilled, by which means a solution of pure butyric acid ether in spirits of wine is obtained.

Butyric acid ether may be also obtained immediately from butyrate of soda, by dissolving 1 part of this salt in 1 part of rectified alcohol, adding 1 part of sulphuric acid, and heating some minutes. The ether collects on the top of the liquid, and is purified by washing with water and with diluted soda solution.

For preparing pine-apple oil, 1 lb. of butyric acid ether is dissolved in 8 lbs. to 10 lbs. of spirits of wine, which should have been previously deprived of its empyreumatic or fusel oil. Pure French spirits of wine will be found best suited for this purpose. According to the purpose for which the pine-apple oil is to be applied, either rectified alcohol of 80° to 90° Tralles, or brandy of 40° to 60°, should be used for dissolving the ether. 20 drops to 25 drops of such an extract will suffice for giving a strong pine-apple odour to 1 lb. of sugar solution, to which some acid, such as tartaric or citric acid, is generally added.

*Bergamot Pear Oil.*—What is called pear-oil is an alcoholic solution of acetate of oxyde of amyle, and acetate of oxyde of ethyle, prepared from potato fusel oil (the hydryte of oxyde of amyle). The potato fusel oil, or oil of potato spirits (in German, *fuseloel*), is the compound distilled over towards the end of the first distillation of spirits made from potatoes, and is an oily liquid of a very strong and nauseous odour. This oil in the state in which it is obtained from large potato brandy distilleries, is never pure; but it may be purified by agitating it with a diluted soda solution, when the pure fusel oil collects as an oily layer on the top of the liquid; this oily substance is then submitted to distillation, and that part which distils over at 100° to 112° Reaumer, is collected, and forms the pure fusel oil.

For preparing acetate of oxyde of amyle from this fusel oil, 1 lb. of pure ice vinegar is mixed with an equal quantity of fusel oil, to which is added half a pound of sulphuric acid; the liquid is digested for some hours at about 100°, when the acetate of oxyde of amyle separates, particularly on being mixed with a small quantity of water. The remaining liquid, when mixed with more water, yields, on being submitted to distillation, a further quantity of acetate of oxyde of amyle. The entire mass of oxyde of amyle thus obtained is now agitated several times with water and a little soda solution, in order to deprive it of all free acid.

The acetate of oxyde of amyle may also be obtained by taking 1 part of fusel oil to 1½ parts of dry acetate of soda, or 2 parts of acetate of potash, with 1 to 1½ parts of sulphuric acid. The liquid having been kept for some time at a gentle heat, the acetate of oxyde of amyle is separated by adding water, and proceeding as above explained. 15 parts of acetate of oxyde of amyle are mixed with 1½ parts of vinegar ether (vinegar naphtha, acetate of oxyde of ethyle), and dissolved in 100 to 120 parts of spirits of wine, as in the case of pine-apple extract; an acid—for instance, tartaric or citric, should be added to the sugar solution, on making use of the pear extract, which addition makes the flavour of the bergamot pear better distinguishable, and the taste acquires at the same time more of the refreshing qualities of fruit.

*Apple Oil.*—What is called apple oil, is a solution of valerianate of oxyde of amyle in spirits of wine, which may be obtained as a secondary product when fusel oil is distilled with chromate of potash and sulphuric acid for the preparation of valerianic acid. The light solution which collects in the tops of the distilled liquid contains valerianate of oxyde of amyle, together with other liquids, such as adehyde, which gives to the product a less agreeable taste and smell. It is therefore to be preferred for preparing pure valerianate of oxyde of amyle.

For preparing valerianic acid, 1 part of fusel oil is mixed by small portions with 3 parts of sulphuric acid, and afterwards 2 parts of water are added. At the same time, a solution of 2½ parts of bichromate of potash in 4½ parts of water is heated in a tubular retort; the first liquid is then permitted to flow very slowly into the liquid of the retort in such manner that the boiling continues but very slowly. The liquid which is distilled over is saturated with carbonate of soda, and is evaporated either to dryness for obtaining valerianate of soda, or to the consistency of syrup, when sulphuric acid is added (say 2 parts of concentrated acid diluted with the same quantity of water, for every 8 parts of crystalline carbonate of soda). The valerianic acid forms an oily layer on the upper part of the liquid, which latter will still yield some valerianic acid on being submitted to distillation. For preparing valerianate of oxyde of amyle, 1 part by weight of pure fusel oil is mixed carefully with an equal quantity by weight of common English sulphuric acid; the resulting solution is added to 1¼ parts of oily valerianic acid, or to 1½ parts of dry valerianate of soda, and is treated by a water-bath and then mixed with water, by which means the impure valerianate of the oxyde of amyle will be separated; this is washed several times with water, afterwards with a solution of carbonate of soda, and finally again with water. In preparing this compound, it is essential that the mixture of sulphuric acid and fusel oil with valerianic acid should not be heated to a too high degree, or too long, as the product would thereby acquire an insufferably pungent smell when required for use. 1 part of valerianate of oxyde of amyle is dissolved in 6 or 8 parts of spirits of wine, and acid is added in the same manner, as has been before explained in the preparation of other extracts.

*Artificial Oil of Bitter Almonds.*—When Mitscherlich, in 1834, discovered nitro-benzole, he little thought, after twenty years to find this body in an industrial exhibition. He certainly, at that time, pointed out the remarkable resemblance which the odour of nitro-benzole had to that of bitter almonds; but the only sources for obtaining benzole at that time, viz., the oil of compressed gas, and the distillation of benzoic acid, were much too expensive, and put an end to the idea of substituting the use of nitro-benzole for oil of bitter almonds. Mansfield, however, in 1849, showed, by careful investigation, that benzole may be produced easily and in large quantities from oil of coal tar, and this discovery has not been lost sight of in the arts. Among the articles of French perfumery in the Great Exhibition, with the title of *artificial oil of bitter almonds*, and the fanciful name of *essence of Mirbane*, there were several specimens of oils, which consisted of more or less pure nitro-benzole. The apparatus used in the preparation of this substance is that proposed by Mr. Mansfield. It consists of a large glass worm, the upper end of which branches into two tubes, which are provided with funnels. A stream of concentrated nitric acid flows slowly through one of these funnels, whilst the other is for the benzole (which for this purpose need not be absolutely pure). At the point at which the tubes of the funnels are united, the two bodies come in contact, the chemical compound formed becomes sufficiently cooled in passing through the worm, and only requires to be washed with water, and finally with some weak solution of carbonate of soda, to be ready for use. Although the nitro-benzole closely resembles oil of bitter almonds in physical properties, it possesses, however, a somewhat different odour, readily recognised by a practised person. However, it answers well for scenting soap, and would be extensively applicable for confectionary and for other culinary purposes. For the latter purpose it has the special advantage over oil of bitter almonds, that it contains no prussic acid.

*The American Annual of Scientific Discovery*, speaking on this subject, says, "The composition and artificial production of the various extracts of fruit and other similar perfumes and essences, strikingly illustrates the wonderful progress which has been made in organic chemistry within the last few years. A position has been taken by some chemists who have carefully investigated this subject, which cannot at present be controverted, that the extracts or perfumes of the various fruits which can be artificially prepared in our laboratories from the basic organic radicals, are identical, and the same with those which nature carefully elaborates in the apple, the pear, the pine-apple, banana, and the like. The whole subject has been investigated more carefully, and has been applied to more practical purposes than the public is generally aware of. Take, for instance, the well-known perfumes known as 'Lublin's Extracts,' extract of geranium, millefleurs, new-mown hay, and many others; all of these are said to be prepared from two or three of the common and cheap essential oils, and from the organic radicals. In addition to perfumes the most agreeable, odours of the most disgusting and nauseous character can also be produced by like means; as for instance the odour of the bed-bug, squash-bug, and of many of the common weeds and plants. As an odour or perfume of a different character can be produced by the action of each different acid on the different oxides of the organic radicals, the number of bodies of this character capable of being produced is almost innumerable, and may possibly embrace every known odour or perfume which is now recognized in the animal, vegetable, or mineral kingdom.

"The various artificial extracts of fruit have been applied to the flavouring of an agreeable species of confectionary known as the 'acidulated fruit drops.' These have been denounced as poisonous by some persons, on the ground that fusel oil is known to produce deleterious effects; and as a natural consequence the confectionary referred to has been discarded. There is, however, no foundation for such statements or belief; and if the confectionary flavoured with these extracts has in any case produced injurious effects, it is undoubtedly to be referred to an injudicious consumption of it, and not to any inherent deleterious property."

## NEWSPAPER STATISTICS.

The towns in England alone, sending Members to Parliament, and not having even a weekly newspaper, may be thus classed:

| | Towns. | M.P. | Population. | Constit. |
|---|---|---|---|---|
| With a population under 5,000 ... | 13 ... | 19 ... | 55,808 ... | 3,806 |
| Over 5,000 and under 10,000 ... | 39 ... | 74 ... | 334,757 ... | 20,160 |
| ,, 10,000 ,, 20,000 ... | 15 ... | 24 ... | 178,373 ... | 11,275 |
| ,, 20,000 ,, 30,000 ... | 5 ... | 6 ... | 134,424 ... | 5,044 |
| ,, 30,000 ,, 40,000 ... | 5 ... | 8 ... | 166,159 ... | 6,880 |
| 40,000, and upwards ... ... | 2 ... | 4 ... | 118,411 ... | 4,657 |
| | 79 | 135 | 987,932 | 51,912 |

The unrepresented towns in England alone, containing 5,000 inhabitants and upwards, and not possessing even a weekly newspaper, may be classed as follows:

| | Towns. | Population. | |
|---|---|---|---|
| Over 5,000 and under 10,000 ... | 62 ... | 402,857 | |
| ,, 10,000 ,, 20,000 ... | 21 ... | 245,716 | |
| 20,000, and upwards ... | 3 ... | 65,873 | |
| | 86 ... | 714,446 | |
| Add to these — Represented Towns ... | 79 ... | 987,932 | |
| And we have — Towns ... | 165 ... | 1,702,378 | without even a Weekly Newspaper. |
| Deduct Represented Towns with less than 5,000 inhabts. | 13 ... | 55,808 | |
| And we have in England alone, Towns containing 5,000 inhabts. and upwards | 152 ... | 1,646,570 | without even a Weekly Newspaper. |

In the Channel Islands (where there are no Taxes on Knowledge), with a population of a few thousands, there are three bi-weekly, one tri-weekly, and eight weekly newspapers.

In the United States, a town with 2,000 inhabitants is seldom without a weekly paper; or a town with 15,000 inhabitants without its daily paper. In England, no daily paper is published out of London.

## AUSTRALIA.

There are few incidents in the history of colonisation more remarkable than that afforded by the present position of our South Australian possessions. We have in the province of Victoria a population of under 200,000, absorbing British products to the amount of above 4,000,000*l.* per annum, and at the present moment we have upwards of 1,200 ships of great tonnage employed in the transport of British energy and manufactures to aid in the great progress now in course of development. In return for this we have an enormous flow of wealth, greatly exceeding in real value the amount above specified, resulting from the unprecedented productiveness of the gold fields. While these last maintain their present character, Victoria will not cease to be the great point of attraction to English personal enterprise. Putting aside the possibility, or rather probability, that under the present system the gold produce must decrease, there are other matters, which induce the confidence that Australia, under proper management, will maintain its prosperity. One past fact alone will go far to prove this:—the wool of New South Wales and South Australia has given a new character to European clothing within the last few years, and has entirely superseded many other sources of this necessary material—one only among a large variety that Australia might readily and profitably bring into existence.

There are several subjects lately brought before the world which evidently will tend to establish and enhance this prosperity, and a brief allusion to them will not be uninteresting. First, as to perfecting the present means of realizing wealth. The ore-grinding machine by Mr. Berdan, described at page 551 of the Journal, promises, if its capabilities are correctly stated, to change greatly the present system of hand-washing, the most tedious, wasteful, and uncertain of the gold producing methods. The balance of wealth which will doubtless increase by this and other methods, improvements on the past, will certainly lead to the necessity for fresh fields of enterprise, and it is most important that these efforts should be well directed.

The important expedition about to leave England under the direction of Mr. Ernest Haug, a gentleman of great energy and extensive acquirements, will certainly lead to great results, if the intended exploration prove successful. The intention is for the scientific nucleus of this expedition to proceed to Aden and Singapore, where it will organize the party. Thence to the islands east of Java, where animals for conveyance will be procured. Thence landing at the Victoria river, the expedition will proceed to the south east, and ascertain the direction of the mountainous range, which it is presumed runs from the northern part of the colony of New South Wales towards Port Essington, and separates the river systems flowing northward and southward. This route, if carried out, will lead to the centre of the continent, whence it is thought it would be better to turn southwards towards the southern colonies.

The determination of the characteristics of the country thus traversed must have a fundamental bearing upon the direction in which colonization should be fostered. In the case of Captain Sturt's celebrated journeys, it was all important to the welfare of Adelaide and South Australia that attention should be directed to the then almost unknown Gipps's Land. That the enterprising originator of the present expedition may meet with every success, is ardently to be wished.

The next point is the result of former exploration. Mr. Trelawney Saunders, well known in the geographic world, proposes a new colony, under the name of "Albert," at the head of the Gulf of Carpentaria, on the north side of Australia. The site of the settlement will be on the Plains of Promise, so glowingly described by Capt. Stokes, R.N. Besides the excellence of the land, the position, it is thought, will command the commerce of that part of the Indian Seas, being the south-eastern extreme of an Asiatic Mediterranean, as the free port of Singapore is at the north-west end, and will thus lead the trade down to the existing Australian population. Other interesting topics contained in the excellent little work privately distributed by Mr. Saunders might be alluded to; but this new sphere, embracing, as it does, a great distinction of climate, will lead to the production of new articles of commerce, among which may be specified *cotton*, olive oil, and wine.

But in order that these advantages may be duly realised by a readily attainable market, which Europe alone at present affords, it is desirable that the means of transit for goods and passengers should be as certain and easy as that which has led to the colonisation of the vast territories of the United States by a British population. And here may be noticed the establishment of a new line of communication with our antipodal colonies.

The Australian *Direct* Steam Navigation Company, established by the enterprising talent of Captains A. S. Hamond and J. C. Hoseason, R.N., and the Australasian Pacific Mail Steam Packet Company, will supply a very serious deficiency in the mutual position of these colonies and parent country. All must remember the disastrous failures of the steam voyages round the Cape of Good Hope—a route characterised by the *Athenæum* as "fit only for convicts, midshipmen, and Colonial-office despatches;" and the great injury they inflicted on the interests of the colony. But these steamers had to encounter every sort of adverse circumstances, which the western route across the Isthmus of Panama does not present. The route proposed, in each case, separates itself into three stages—from Milford Haven, or Southampton, to Aspinwall on the Isthmus; the railway transit of two hours to Panama, and the passage across the noble Pacific, whose characteristics amply bear out its title, and offer, to passengers especially, the most delightful navigation in the world; the hurricane, the icebergs, and stormy weather of the Cape of Good Hope are entirely unknown. The stopping-place between Panama and the destination is to be the classic Tahiti, or, what might be better, the Gambier Islands, at the eastern extremity of the dangerous Paumotu Group. The difference in the respective distances is not so considerable; but the time to be occupied in the transit is more manifest, being only fifty-five days. Of the minor details of this important undertaking it is needless here to speak, but there is one fact which our engineers should endeavour satisfactorily to explain, and that is, the abandonment of the screw for the former paddle-wheel as a propeller. This is in opposition to the usually received opinion as to their respective merits, and is deserving of some serious attention.

With these topics, so new and so important, it must be convincing to all that these distant lands, whose capabilities were totally untried within the memory of many now living, and the whole progress of which has commenced, as it were, yesterday, must play an important part in the future history of the world.

## BANK-NOTES AND PHOTOGRAPHY.

Paragraphs have lately appeared in the papers, stating that frauds have been practised on the Bank of England, by counterfeit notes produced by the agency of photography. We are enabled to state, on undoubted authority, that there is not one word of truth in the paragraphs referred to. No attempt of the kind has been made. The difficulty, indeed the impossibility, of producing fac-simile Bank of England notes by any photographic process which would escape detection, is well pointed out in a letter to the *Times*, by Mr. E. G. Wood, one of the members of this Society. He says:

> "The alarm that may be excited by such a paragraph would be quite unfounded, for the detection of the fraudulent note is very easy.
>
> "The watermark of the bank-note results from a difference in the substance of the paper, and is only visible by transmitted light; that is, when the note is held up so that the light may pass through it, it being in the body of the paper.
>
> "Now, the imitated watermark would be on the surface only, and it would be produced by a slight darkening of the front of the note, corresponding exactly with the thicker portions of the paper of the note it was copied from, and would, therefore, be visible by reflected light as well as by transmitted light, and would be on the front only, and not on the back as well; and consequently, by doubling a note so produced, so as to see at the same time part of the back and part of the front, the fraud would be at once detected, as the watermark would not be on both."

## ELECTRIC TIME-BALL AT THE ROYAL OBSERVATORY, EDINBURGH.*

A time-ball, similar to that at the Royal Observatory, Greenwich, and other places, has just been erected on the top of Nelson's Monument, Edinburgh, with electric communication to the Royal Observatory there. The machinery has been constructed by Messrs. Maudslay and Field.

The mode hitherto adopted for setting chronometers has been to adjust a clock in one of the out-buildings of the Observatory daily to the true time, and the various chronometer makers of Edinburgh and Leith, the mariners in the Docks and Firth, and others, have sent messengers with portable time-pieces to procure the indications of the clock. But this method evidently gave excessive trouble to all concerned, and marred the result most prejudicially; for when a chronometer is carried all the way from Leith to the Calton-hill and back, the shaking that it gets must greatly alter its rate.

The earliest signal-balls which were made, though provided with ropes passing over pulleys by which they were enabled in their descent to raise a series of weights in order to check in a gradual manner the velocity of their fall, were yet invariably found, after a short time, to pull or to smash themselves to pieces. Steel springs were next tried to break the force of the concussion, but were pretty sure to be themselves snapped with a heavy ball, while a light one would not descend quick enough on a windy day. Recourse was finally had to compressed air, a spring of perfect temper, never injured by time, and capable of any degree of delicacy at first, and any amount of violent resistance at last.

To carry out this principle, a staff was attached to the ball below, terminating in a piston, which in the course of its descent entered an accurately-turned cylinder, and compressing the air therein, was gradually brought to rest. Were the cylinder quite closed at the bottom, the spring of the included air might be greater than required, and also have a tendency to throw the ball up the mast again, which would be somewhat troublesome to observers. But by simply opening a graduated aperture below, so as to admit of the air partially escaping as it is compressed, the strength of the spring is diminished, and by the time that the piston has descended to the lowest point, there is so little air remaining in the cylinder, and it is still escaping so fast, that there is no power left to make the ball rebound.

Thus the time-ball is made to descend without injuring the building or spoiling itself; and the trigger apparatus, by which the detent that holds the ball when hauled to the top of the mast is unlocked, being very nicely adjusted, and observers being duly cautioned to look to the instant of *separation of the ball from the cross-staff*, the descent—that is, this first part of it—is as instantaneous as need be. In the next place, the trigger being pulled, not by the finger of a person at the ball, but by an electro-magnet which is instantaneously set in action by the contact made at the end of a wire led into the walls of the Observatory, and brought immediately before the transit clock itself; the instant for the signal outside can be conveyed to the undeviating mechanism there with all the refinement of a chamber experiment, and to the utmost extent of the observer's knowledge of the real time by the stars, as obtained the previous night, and continued on by the clock.

For raising the ball, a plan has been proposed, by which a weight having been wound up at *any previous hour of the day or night*, then on electrical contact being made at the Observatory by the astronomer at a precise moment, that weight is unlocked, immediately descends, and hauls up the ball. Next at five, or any other number of minutes, a second contact being made on another wire, lets the ball down.

It has been suggested to place the Observatory at Edinburgh in galvanic connection with that at Greenwich, so that Greenwich mean time, which mariners always require, and Edinburgh citizens do at present, should be exhibited in place of the local time; and this, it is believed, will shortly be done.*

# HOME CORRESPONDENCE.

## FLAX, AND ITS PRODUCTS, IN IRELAND.

*Contributed by William Charley, Seymour-hill, Belfast.*

### LETTER I.

Before giving any details of the different improvements now in progress, I think a brief history of the establishment in this country of flax cultivation and manufacture will be interesting to your readers.

The first mention on record of Irish linen occurs so far back as the thirteenth century (*see* Maddox's "History of the Exchequer"); but it was not until the seventeenth century it acquired any national importance. It is a curious circumstance, that during the reign of Charles II. the extension of the woollen manufacture appears to have made such rapid strides that the jealousy of the English manufacturers was fiercely aroused. Protection in its most bigoted form was the practice of those times, and consequently we find an Act passed by the British

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* Abridged from the *Scotsman*.

* The means of working the Greenwich time signals will be found described by Mr. C. Shepherd, jun., at page 85 of this Journal.

Parliament prohibiting any export of wool from Ireland except to England and Wales.

Not content with this, in the tenth year of William III. another Act was passed, founded on the Report of a Special Committee, forbidding any export whatever from Ireland of wool or woollen manufacture. The reasons given by the Committee for their recommendation were, that the English trade must be preserved, and that wool and labour being so much cheaper in Ireland than in Great Britain, the manufacturers there could not compete at all successfully with the sister country, Hibernia.'

The woollen trade being thus reduced to the quantity required for home consumption, of course rapidly declined, and its place was soon taken by the linen manufacture. We find, in Queen Anne's reign, the Irish House of Commons sent a Bill in favour of the linen trade to Her Majesty, accompanied with an address requesting permission from the English Parliament to export this article to the British colonies! The English ministers, after crushing the woollen trade, always appeared anxious to encourage that of linen, in which the Irish had for competitors the French and Flemish artizans (*see* Crawford's "History of Ireland," published 1783). The celebrated Lord Strafford not only favoured this new branch of industry by his protection and countenance, while Lord-Lieutenant of Ireland, but embarked a large sum himself in the trade.

This noble linen merchant was the originator of many improvements: he brought over from the Continent a number of spinners and manufacturers, who taught our countrymen the superior systems of treatment in operation there.

To no one, however, are we more indebted, than to M. Louis Crommelin, who, after the repeal of the Edict of Nantes, A.D. 1699, fled from France, and settled in the neighbourhood of Lisburn. He was accompanied by a number of refugees, and being acquainted with the French manufacture, he greatly improved the linen trade in his adopted country. Eight years after, the Irish Parliament confirmed the establishment of the linen trade in Ulster, and in 1711 a Board of Trustees was formed to encourage and extend the rising manufacture. Among others expedients, the Duke of Ormonde, the then Lord-Lieutenant, directed that hat bands and scarfs of linen should be used at funerals, which custom prevails to the present time, but was intended at first as a stimulus to consumption. At this period the machinery in use was very simple and worked principally by hand; soon after, in 1725, new machinery was invented and applied for many of the processes, and in 1761 Dr. James Ferguson, of Belfast, received a premium of 300*l.* from the Linen Board, for the successful application of lime in linen bleaching. In 1770, the same gentleman introduced the use of sulphuric acid; up to this period the usual acid employed was buttermilk, and the soil of cattle was also commonly applied instead of alkali. After this year improvements rapidly took place, potash for making ley to boil the yarns and cloth coming into use in 1780, and that most valuable bleaching agent, chloride of lime, in 1795 (*see* Pilson's "History of Belfast.") During the past fifty years improvements in every branch have continued to go on; but these I will defer describing for the present. In my next letter I purpose giving a short account of the operations of the Linen Board for the twenty years preceding its dissolution, and also an outline of any important changes in the manufacture of linen from that time down to the present. This will complete the chain of past history, and enable your readers to understand much more clearly any subsequent papers on existing and proposed improvements.

## IMPROVEMENTS IN THE MANIPULATION OF SUGAR.

SIR,—In the ordinary process of refining sugar, the raw material—muscovado, or other sort of raw sugar—is first dissolved in the blow-up cistern, passed through cotton bags, then filtered through deep beds of animal charcoal, and finally the liquor is concentrated in vacuo.

Anteriorly to the introduction of animal charcoal into the sugar refineries, the raw sugar received a preliminary cleansing operation, either by the process of making meltings, or by the pneumatic curing method. Recently it has been proposed to filter through charcoal the drainage only of the cured sugar, and not the latter, and to pass through filter-bags the clarification of the two products amalgamated. By this method of refining sugar a saving of 75 per cent. of charcoal is obtained.

J. A. L.

## STEAM FIRE-ENGINE.

39, Bedford-square, Oct. 13, 18

SIR,—On my return to town my attention has been called to the "Miscellanea" of the JOURNAL, No. 45, of the 30th ult., in which the American steam fire-engine is alluded to as a novelty, but whether as such in America or in principle altogether, is not quite clear; but I think it right to call the attention of yourself and readers to the steam fire-engine constructed years ago by myself, and kept for years at my own expense for the use of the public, and in the hope that it would be mutually beneficial. For the particulars of the English steam fire-engine I beg to refer you to the twelfth, seventeenth, and eighteenth volumes of the *Mechanics' Magazine*,—February 30th, 1830; May 26th, 1832; and October 6th, same year, when a steam fire-engine of great power was built by and sent over to the King of Prussia, capable of throwing ninety tons of water per hour to a height of 120 feet.

The steam fire engine—which was the one exclusively used in London, and whose powers were brought so conspicuously into play at the conflagrations of the Argyll Rooms, the English Opera-house, Wells-street, and of Barclay, Perkins, and Co.'s brewery—was about six horse-power. Its weight, with complement of water and fuel in the boiler, 45 cwt., required thirteen minutes to raise sufficient steam (as witnessed by the Commissioners of Police) to throw a stream of water equal to forty-five tons per hour over a pole ninety feet in height, through either one or two jets, as might be required. Such an engine, with the aid of the fire annihilator (Phillips's improved), would defy the spread of any fire—evidenced by what it did upon the above occasions already alluded to.

I shall be happy to afford any of your readers any further information or details upon the subject.

I am, Sir,
Your obedient Servant,
JOHN BRAITHWAITE.

## PROCEEDINGS OF INSTITUTIONS.

CLAPHAM.—A very excellent lecture was delivered on "Popular Superstitions," on the evening of the [illegible]th October, before the members of the Literary and Scientific Institution, by Mr. Joseph Simpson, Librarian, &c., of the Islington Institution. Several examples of the extraordinary fallacies connected with the idolatrous worship of the dark ages were referred to by the lecturer, and their continuance, in a somewhat modified character.

even to the present century. He then proceeded to define the causes and effects of the more popular errors common amongst the uneducated masses of society, which he proved to be chiefly attributable to their ignorance of the simple laws of nature, and showed that most of the existing superstitions so firmly believed in by them as having a spiritual origin, were in reality to be easily accounted for by the ordinary operations of natural phenomena, as proved by the deductions of scientific researches. The lecture was interspersed with illustrations of the prevailing superstitions of many countries, the extremes to which a morbid desire for the possession of relics might be carried, the effects of a deep-rooted love of the marvellous, and the results, too frequently, of an unfortunate tendency of the belief that futurity can be explored, and of the confidence of the unwary in the promises and prognostications of the charlatan. Denouncing the still-continued publication of such books as Prophetic Almanacs, Dream books, and other similar productions, as detrimental to the morality and well-being of many thousands of our fellow-creatures, the lecturer concluded a most entertaining and instructive discourse, by pointing out the most efficient remedies for the evils arising from superstitious belief, in the domestic training of youth, a wider spread of religious and general education, and of scientific knowledge, strengthened by the formation of Literary, Scientific, and Mechanics' Institutions.

CHICHESTER.—On Wednesday evening, the 5th instant, the members of the Literary Society and Mechanics' Institute held their Annual Meeting in the Lecture room at the Museum, when the Rev. J. Fullagar, Vice-president, took the Chair. The usual routine business was gone through, and the Secretary read the Report from the retiring Committee, which showed that the Museum had received numerous and important additions, and that it continued to attract a large share of public notice, not less than 1,980 visitors having inspected its contents during the past year. Among the donors, the most liberal contributors were the Duke of Richmond, Lady Reynall, Sir John Forbes, M.D., and H. W. Freeland, Esq. The Library had also been largely increased, including many works of standard merit, besides numerous ones of a more popular and interesting character. In the list of donations to this department were several valuable publications presented by the Society of Arts, and some of great antiquarian and historical interest presented by the Archæological Institute, and by Albert Way, Esq. The Report congratulated the members on the good attendance at the lectures during the last Session; and in presenting a new syllabus, a confident hope was expressed that the ensuing Session would prove yet more attractive than the last. The financial statement showed a balance due to the Treasurer of 11*l.*, which, together with some outstanding demands, made a deficiency of about 25*l.*, incurred to a considerable extent in outlays on repairs and improvements of the building, particularly the Lecture-room, which had been made to correspond in character with the Museum. There had, however, been an increase of members, the present number being 367. The Report closed with a tribute to the memory of the late J. B. Freeland, Esq., who for a period of twenty-seven years was a liberal supporter and Vice-president of the Mechanics' Institution, and subsequently of the amalgamated Society. The following officers were elected for the ensuing year: His Grace the Duke of Richmond was re-elected President; the Rev. J. Fullagar, Dr. Tyacke, B. Adams and W. Gruggen, Esqs., Vice-presidents; Mr. G. Paull, Treasurer; Mr. T. Pescod, Curator; and Mr. J. Gauntlett, Secretary, in the place of Mr. Cawthorne, resigned. On a ballot, the following gentlemen were placed on the Committee: Messrs. Allen, Barnard, Beatson, Cawthorne, Dale, W. W. Dendy, J. Farr, G. Irving, J. S. Jones, S. Merrick, Mittin, Molesworth, Pullinger, Rogers, Sawyer, Silverlock, T. Smith, and T. Spring. Messrs. Dudden and Gruggen were appointed Auditors; and the thanks of the meeting voted to the gratuitous lecturers during the past Session; to the Mayor, for the use of the Assembly-room; to the late Secretary, Mr. Cawthorne; and to the Rev. J. Fullagar, for his conduct as Chairman. On the following Monday a Concert, under the patronage of this Society, took place in the Assembly-room, when the Collins family afforded an agreeable evening's entertainment to a numerous company.

LEEDS.—Mr. Edmund Wheeler, has just completed a good practical course of three Lectures on the "Electric Telegraph," at the Mechanics' Institution and Literary Society. The course comprised a very comprehensive and lucid view of all the expedients employed for conveying information by voltaic, electro-magnetic, and magnetic agency. After describing the ordinary needle galvanometer index, now pretty generally understood, the Lecturer explained all the appliances for conducting the electric current to its destination, and applying it as required. Among the curiosities of the electro-magnetic science, from which very valuable results might be anticipated, was that of the continuance of an electric current by the water of a river without the use of wires; this had been in operation at Havre, on the Susquehannah, for several years, and had been tried experimentally on the Thames, and other rivers and canals; and if the principle could be extended to the broad waters, it was difficult to conjecture the limit of its application. The various submarine telegraphs and their appliances were described, and the Lecturer stated, that London is now in direct communication with Paris, Madrid, Venice, Trieste, and Cracow. Mr. Wheeler discussed the question of communication with America by telegraph; he thought ocean wires were not very likely to be laid down, but he considered either of the two plans proposed for a more circuitous route within the range of the practical, viz., the one by the north-western islands, thence to Iceland, Greenland, and over Davis's Straits to Labrador; or the eastern course, through Central Asia, to Behring's Straits, and so by the west coast of America to the great centres of civilization in the New World; the latter being the course proposed by Mr. Elihu Burritt. Mr. Wheeler delivered his course to large audiences, and by the completeness of his models, and other illustrations, and the remarkable clearness of his style, rendered the subject deeply interesting.

LOUGHBOROUGH.—The annual general meeting of the members of the Literary and Philosophical Society was held on Tuesday, September 27th, the Rev. E. O. Crawley, presiding. The Secretary, on reading the Report, announced the increased prosperity of the Society, both as regards the number of members, and its extended sphere of usefulness. Allusion was made to the advantages derived from the union with the Society of Arts, from whom had been received, in the course of the year, several valuable works; and from the List of Lecturers, lately received, a selection would be made for the ensuing session. The general business was proceeded with, after which the election of officers for the ensuing year was made.

READING.—The directors of the Literary, Scientific, and Mechanics' Institution, have recently resolved that mechanics shall be admitted to the Library, Classes, Reading-room, and Lectures, on payment of 6s. per annum; and that non-members should be admitted to the Reading-room, on the payment of 1*d*. each time.

**Sherbourne.**—The opening Lecture of the present session, at the Literary Institution, was delivered by Mr. W. J. Fox, M.P., on Monday, the 3rd inst. The President for the year, Mr. R. Gordon, presided; and after making a few preliminary remarks, introduced Mr. Fox, who had chosen for his subject, "The Last Census." In the course of his observations he said, that "those parts of the census which relate to education are not yet complete, but some of the results have been arrived at. The first impression we receive of them is one of high gratification. It is within the last half century that the education of this country may be said to have been created. Taking it only from 1818 to 1851, the increase has been in

Day-schools, in the country, from 19,000 to 46,000.
Scholars in day-schools, from 674,800 to 2,144,000.
Sunday-schools, from 5,000 to 23,000.
Sunday-scholars, from 477,000 to 2,407,000.

And if we take the proportion to the population, the number of children in day-schools has increased from 1 in 17 to 1 in 8: of Sunday-scholars, from 1 in 24 to 1 in 7. But there was, amidst all this, subject matter for regret. In the counties of Dorset, Devon, and Somerset, they had built schools very liberally, but they had actually school-room for twice as many children as went to the schools. Money had been expended in brick and mortar, not in teachers. They had 17,000 children in the schools of those counties, and schools large enough for 34,000. In some of our large towns the case was still worse. In Manchester alone there were 30,000 children of a school age,—that is to say, between four and fifteen, who were neither at school nor at work; and there were as many more in Liverpool." At the close of the Lecture, it was moved by Mr. W. C. Macready, seconded by Mr. Penney, M.P., that the hearty thanks of the meeting be presented to Mr. Fox, which was carried by acclamation.

**Sevenoaks.**—On Thursday, September 22nd, Mr. Mottley, of Margate, gave a second lecture at the Literary Institution, "On Matter, Chemically Considered." The principal subject of the lecture related to that peculiar state or condition of matter termed allotropic. Mr. Mottley exhibited sulphur, carbon, and phosphorus in distinct condition, and observed that the allotropic change of state was justly considered as one of the most important developments of modern chemistry. It was to Professor Schönbein, of Basle, that science was indebted for the important fact that oxygen might exist in an allotropic condition—a subject of the gravest importance at the present time, when we were alarmed by the actual presence of a terrible epidemic. Mr. Mottley explained the various modes of generating ozone, as oxygen was termed when in a state of increased activity. Practically it was of importance, as indicating, by its presence, a pure state of the atmosphere—ozonized, or allotropic, oxygen being the great purifier, disinfectant, and deodorizer. Ozone was detected in the atmosphere by means of paper, rendered sensitive by being immersed in a mixture of iodide of potassium and arrowroot starch. The Lecturer exposed some of the prepared paper on a day particularly favourable to the presence of ozone, when the paper changed colour rapidly, and assumed a bright blue tint; but in confined, ill-ventilated, and unhealthy situations, it retained its original whiteness. Those localities where the paper remained unaltered were the chosen abodes of fever of various types,—thus clearly indicating the necessity of, as far as possible, opening the close, ill-ventilated courts and alleys in crowded cities to currents of air. The test for ozone was 1 part of iodide of potassium, 10 parts of arrowroot, and 100 parts of water, boiled for a short space of time. A little of this preparation being placed on paper, and dried, it formed Schönbein's test; a slip being introduced dry into the atmosphere supposed to contain ozone, and then moistened, instantly assumed a blue tint, the shade depending on the amount of ozone present.

**Wisbech.**—A General Meeting of the members of the Mechanics' Institution, was held at the Public Hall, on the 27th ult., when the following persons were elected as the Committee for the ensuing year: Messrs. Cunnington, Wherry, Bays, Oliver, R. B. Dawbarn, Bell, J. Batterham, Reynoldson, Haselwood, Hudson, and Poock. The Institution has been entirely remodelled; the rules have been modified, the library rearranged and catalogued, and a complete change has been made in the officers. Arrangements have been made with six gentlemen to deliver Lectures during the winter months; and in consequence it is supposed of these alterations, there has been a large accession of new members.

## MISCELLANEA.

**A Mechanics' Institute Robbed by a Member of its Committee.**—At the Colchester Petty Sessions, on Tuesday last, George Robert Coleman, twenty-six, whitesmith, a young man of superior education, was indicted for stealing 67 lbs. weight of newspapers from the Colchester Mechanics' Institution. The prosecutor was honorary Secretary of the Mechanics' Institution, and the prisoner a member of the Committee, who, until the bringing of this charge, had been looked upon with great respect, and had not only been a member for a considerable time, but had even benefited the funds of the Institution by giving occasional lectures. James Beaumont, apprentice to prisoner's father, proved that on an evening about four or five weeks ago he received of prisoner, behind his father's gate, a quantity of newspapers, which, by direction of prisoner, he sold to Mr. Carman, grocer, Wire-street, opposite, for 8s., and gave the money to prisoner. Witness also deposed to receiving 17 lbs. weight of newspapers from prisoner in a similar way, which he sold to Mr. White, glover, for 5s., and gave the money to prisoner; also some to Mr. Hawley, grocer, St. Botolph-street. He recollected prisoner delivering a lecture on gas in February last, and shortly afterwards carried away a box of his from the Institution. Henry Saxty Garland, apprentice to prisoner's father, deposed to purchasing 11 lbs. of *Times* newspapers of prisoner for 2*s*. 3½*d*., for the use of his mother, who was a pork and sausage dealer. He had heard prisoner lecture on chemistry and coal-gas, illustrated by his apparatus, but had not heard him discourse on Mr. George Dawson's subject of "Things Unseen," illustrated by engravings. Superintendent Kent deposed to receiving bundles of the *Times* newspapers from Mr. Carman, sold by prisoner's father's boy, and which he produced. About thirty of them bore the Institution stamp. Mr. Winch, the librarian, brought a bundle of papers from the Institution, and they compared them with the dates of those Kent received from the witnesses, but he did not suffer the Librarian's papers to be intermingled with his. Mr John Winch, Librarian of the Institution, proved filing the papers and putting them away in the closet of the chess-room, where they were safe in July; and he did not miss them till September 13th. He had searched the file of papers, and missed all those containing the exact dates and file-marks produced by the police, and believed them to be the property of the Institution. Mr. Chambers offered what he considered explanations of the facts consistent with prisoner's innocence, and utterly inconsistent with his guilt. Prisoner's character, and the position he filled in the Institution, he contended, out-weighed all the evidence which was brought against him. It was very improbable that such an intelligent young man would have sacrificed his character, position, the love of his relations, the acquaintance and society of his friends, and everything which made life worth having, for the paltry motive of gaining a few shillings. After urging various arguments to show that the evidence was too incomplete to warrant a conviction, the learned Counsel left it, he said, for the Jury to say whether a young man occupying the position in an Institution in which he was a member ten years, an officer, and a lecturer, who was the only son of his parents, whose hearts were broken while he spoke, at the enormous peril in which circumstances had placed him—with no want unsatisfied, with no ill-regulated mind—to acquire 20*s.* at the expense of character, reputation, esteem, honour, integrity, or principle, but with every reason on earth to deter him from the commission of the crime, would have been guilty of the charge laid against him? In summing up, the learned Recorder said the Jury would give such weight to the pertinent observations of the learned Counsel for the defence as they deserved. If the Jury thought there was a reasonable doubt, they would give prisoner the benefit of it; but if they thought the evidence was satisfactory and conclusive, they would, however painful their duty, convict him. The Jury retired for about three-quarters of an hour, and returned with a verdict of guilty, but strongly recommended the prisoner to mercy. The Recorder, in sentencing prisoner, said he had been found guilty of a charge of larceny, after a very careful inquiry, and he thought no one in court was surprised at the conclusion at which the Jury had arrived. To the recommendation the Court gave such effect as it felt itself at liberty to do; but he could not conceal his belief that prisoner's case was a bad one; and he deplored his present position, as he had no doubt he did by that time himself. Prisoner was then sentenced to four months' imprisonment, with hard labour.

SALFORD ROYAL LIBRARY AND MUSEUM. — An addition has lately been made to this Library, which was opened in January, 1850, or before the Manchester Free Library. The exterior of the old building has not been altered, but the interior has been quite remodelled; another room has been added to the library, which now contains 11,000 volumes, providing room for 5,000 volumes, towards which Sir Benjamin Heywood has contributed 150 volumes of journals of Parliament; a large corridor, now filled with fine casts of statuary; a reading-room, of magnificent proportions, capable of accommodating 200 persons, for whom tables and benches are provided; a grand staircase, leading into an upper corridor; a large and well-lighted picture-gallery, and rooms for the reception of a collection of specimens of natural history, and of ethnological and antiquarian objects. At present, only about a third of the design has been carried out. The reading-room and picture-gallery form one wing, to which a corresponding one has yet to be built, and then the front has to be altered so as to complete the project. The means for erecting this addition have been provided in the following manner: the committee had about 1,000*l.* in hand; the Corporation of Salford gave 1,500*l.* out of the profits of the gas-works; and Alderman Langworthy, late Mayor of Salford, gave 2,000*l.*; but still a sum of 500*l.* remains to be provided.

SUBMARINE TELEGRAPH IN AUSTRALIA.—A submarine telegraph has been projected to connect Van Diemen's Land with Australia, in connection with a line to Melbourne. Mr. Rankin, in a report read before the Royal Society of Van Diemen's Land, made the following statements:—"At the eastern end of Bass's Straits, between Mount Wilson and Australia, and Cape Portland in Van Diemen's Land, there extends a chain of islands which afford remarkable facilities for the laying of a submarine telegraph to communicate through Melbourne with Sydney and Geelong. The submarine telegraph cable for this purpose will cost, at the present prices, including freight, about 100*l.* per mile, and may probably be obtained for 80*l.* It would consist of detached portions stretching from island to island, between Cape Portland and Mount Wilson, as also of two small portions, each about a mile or a mile and a half long, crossing the inlets on each side of Phillip Island, which appears to be a better route from Mount Wilson to Melbourne than to follow the main land the whole way. The total length of submarine telegraph required would be about 150 miles. The length of land telegraph required in connection with this line would be about 1,010 miles.

INDUSTRIAL SOCIETY OF FRANCE.—The Society for the Encouragement of National Industry in France has offered a prize of 1,000 francs for the best treatise "On the evils attending the universal Consumption of the Potato as an article of food."

INK FOR STEEL PENS.—Professor Runge has long sought to obtain an ink which would not yield sediment, which should adhere to paper, resist the application of acids, and have no action on steel pens. He has at length obtained a liquid of this kind, containing only Campeachy wood, chromate of potassa, and water. As it contains neither vinegar, gum, sulphates of iron and copper, nor galls, its cost is very moderate. The proportions are 500 litres decoction of Campeachy wood to 500 grammes chromate of potassa. The Campeachy wood is boiled in a sufficient quantity of water to form 80 litres (4½ litres = 1 English gallon) of decoction from 10 kilogrammes of wood (about 20lbs.) After the liquid is cool, the chromate is added, and the whole well stirred. The ink is then ready, and may be used at once. Any addition of gum would be injurious. It may appear strange that so little chrome should convert so large a quantity of decoction into ink; but the proportion must not be exceeded, as a larger amount would destroy the colouring matter. If, on the other hand, the proportions here given are observed, a blackish blue is formed from the yellow pigment of the wood. This is not a suspended precipitate, like the gallate of iron in common ink, but a true solution, from which no sediment can be deposited. A paper written with this ink may be immersed in water for twenty-four hours without injury. Dilute acids do not destroy it, or change its tint. The pens used with this ink should be perfectly free from grease, and may for this purpose be cleaned by immersing them in ley of wood-ashes.—*Artizan.*

AMERICAN TRADE COMPETITION IN INDIA.—The East India Court of Directors have transmitted to Mr. Hugh Fleming, for the use and information of the Manchester Commercial Association, some interesting items of intelligence respecting a branch of trade which enterprising Americans have opened with Central Asia. It is well known that the branch of the cotton trade in which the manufacturers of the United States can best compete with those in this country, is that in coarse fabrics. In these there is a heavy weight of low-priced cotton with comparatively little labour, and the charge of transit on the raw material to this country becomes an important item of cost, which the American manufacturers, with the cotton growing at their own doors, are able to save. The manufacture in question is a coarse unbleached fabric, such as in England would be termed towelling, but termed by the Americans sheeting, and is well suited to the wants of Asiatic communities. They ship a load of these sheetings to the coast of India with a supercargo on board, who takes charge of the sale, receiving in return such raw products as the natives can give, and as will meet a ready market at home; and a trade or barter of this kind is conducted at comparatively little cost to that which our merchants incur with large establishments at Bombay, and having to pay heavy charges for commissions, and for landing, shipping, storing, and duties.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

### *From Gazette, 7th October*, 1853.

*Dated 10th August*, 1853.

1864. W. E. Newton, 66, Chancery-lane—Preparation for facilitating drying of pigments. (A communication.)

*Dated 10th September.*

2091. S. T. Jones, 11, Trigon-terrace, Clapham-road—Propelling.
2095. T. W. Gilbert, Limehouse—Improvements in sewing sails; &c.

*Dated 22nd September.*

2189. T. Smedley, Holywell, Flintshire—Railway-train signal;
2191. F. C. Calvert, Manchester—Separating emery.
2193. E. Oldfield, Salford—Spinning machinery.
2195. G. White, 5, Lawrence Pountney-lane—Paddle-wheel.

*Dated 23rd September.*

2197. J. Leetch, Birmingham—Breech-loading fire-arms.
2198. C. Alexander, 373, Albany-road, Camberwell—Preparing inlaid work in veneers, and fixing the same to walls, &c., and on floors, and in rendering such floors water and fireproof.
2199. A. E. L. Bellford, 16, Castle-street, Holborn—Application of extract from pine-trees for dyeing. (A communication.)
2200. R. Varvill, 30, Highouse-gate, York—Mortising machine.
2201. W. Dantee, 5, New Quay, Liverpool—Purifying water.

*Dated 24th September.*

2202. J. G. Jones, Islington—Signals from one part of railway train to another.
2203. H. Tucker, Massachusetts—Applying colours to surfaces by means of a liquid.
2204. A. Dalgety, 76, Florence-road, Deptford—Lathes.
2205. W. Farmer, Fulham Brewery—Preserving provisions.
2206. C. E. Austin, Rookwoods, Stroud, Gloucestershire—Reaping machine.
2207. C. Maitland, Alloa, and W. Gorrie Rosemains, Cranston, N. B.—Heating water, &c.

*Dated 26th September.*

2208. J. Smith, Law Hill, Perth—Scythes.
2210. J. Ellesdon, London—Portable and convertible chairs.
2211. H. Winter, Castle-street, Holborn — Trousers without braces, &c.
2212. W. A. Biddell, Great Sutton-street—Alarums or signals for railways, ships, houses, &c.

*Dated 27th September.*

2214. R. Popple Beverley—Machinery for slubbing, roving, &c.
2216. W. P. Sharp, John Hill, and W. Martin, Manchester—Spinning machinery.
2217. J. Bury, Lower Mosley-street, Manchester, and W. Green, Islington—Treating, stretching, and finishing textile fabrics, and machinery for same.
2218. R. Brisco, Low Mill House, St. Bees, and P. S. Horsman, St. John's, Beckermel, Cumberland—Preparation of flax, &c.

*Dated 28th September.*

2220. L. D. Girard, Paris—Hydraulic engines.
2222. J. H. Johnson, 47, Lincoln's-inn Fields—Cutting paper.
2224. J. F. Van Waesberghe, Lokeren, Belgium—Artificial vinegar.
2226. T. Askie, Little Britain, London—Churns and agitating apparatus.
2228. M. O. B. Lesage, 16, Castle street, Holborn—Hydraulic engines.

*Dated 30th September.*

2238. J. Plants, Berwick, Lancashire—Manufacture of textile fabrics.
2240. J. Taylor, Princes-square—Preparation of skins.

APPLICATIONS WITH COMPLETE SPECIFICATIONS FILED.

2230. H. J. Iliffe, J. Newman, and H. Jenkins, Birmingham—Buttons. (29th Sept.)
2241. C. Bloomer, Goldshill, West Bromwich, Staffordshire—Anchors. (1st Oct.)

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 6th October, 1853.*

825. Henry Leachman, of Compton-terrace, Islington—Improvements in the manufacture of iron. (A communication.)
847. George Humphrey, of Brighton—Invention of an improved self-acting safety-valve, for locomotive, marine, and other steam-boilers.
854. Stephen Taylor, of New York—Improved machinery for weaving seamless goods. (A communication.)
864. William Urquhart, of Great Queen-street—Improvements in the manufacture of printers' types and other articles used in letter-press printing.
865. William Russell Palmer, of Elizabeth City, North Carolina—Improvements in the construction and arrangement of machines for the application of horse-power, which he designates as "Palmer's Improved Horse-power."
866. William Russell Palmer, of Elizabeth City, North Carolina—Improvements in machines for threshing seeds and grains, and for cleaning them from the straw and chaff after they are threshed, which he designates as "Palmer's American Seed and Grain Thresher and Winnower."
869. Donald Nicoll, of Regent-street—Improvements in garments, and in sewing or uniting the seams of the same.
870. Samuel Russell and Robert Murray McTurk, of Sheffield—Improvements in metallic handles for table cutlery, daggers and such-like instruments.
875. James Taylor, of Carlisle, Isaac Brown, of the same place, and John Brown, of Oxford-street—Improvements in the manufacture or production of charred peat.
881. Robert John Kaye, of Bury, and John Ormrod Openshaw, of Roach Mount, near Bury—Improvements in obtaining motive-power by electro-magnetism.
895. Charles Clifford, of Inner Temple-lane—Improvements in apparatus for lowering boats evenly, and preventing their filling with water.
902. John Bethell, of Parliament-street—Improvements in the manufacture of flax.
924. Jean Marie Souchon, of Paris—Improvements in the manufacture and purification of gas for illumination and certain products therefrom, and in apparatus for that purpose.
931. Richard Ford Sturges, of Birmingham—Improved apparatus for making vegetable and other infusions and solutions.
932. Joel Watts, of Dover Cottage, Sleaford street, Battersea-fields—Improvements in the construction of pistons of steam and other engines; applicable also to force-pumps and lifting-pumps.
938. François George Sicardo, of Marseilles—Invention of a new rotary steam-engine.
955. Richard Archibald Brooman, of Fleet street—Improvements in reaping and gathering-machinery. (A communication.)
963. James Petrie, of Rochdale—Certain improvements in steam-engines.
1159. Henry Potter Burt, of Charlotte-row—Improvements in portable houses.
1236. Edward Briggs, of the Castleton Mills, near Rochdale—Improvements in the manufacture of pile fabrics and in the machinery or apparatus employed therein.
1613. Thomas William Kennard, of Duke street, Adelphi—Improvements in iron bridges.
1748. Warren De la Rue, of Bunhill-row—Invention of a means of treating and preparing certain tar or naphtha, and applying products thereof.
1753. John Dawson, of Linlithgow, Scotland—Invention of a new instrument or apparatus for the purpose of preventing fraud in drawing off liquids.
1759. Farnham Maxwell Lyte, of Florian, Torquay—improvements in obtaining iodide of potassium when treating certain metals.
1791. Philipp Schäfer and Frederick Schäfer, of Brewer-street—Improvements in travelling-bags.
1795. Augustus Russell Pope, of Massachusetts, America—Invention of a new and useful or improved electro-magnetic alarm apparatus, to be applied to a door or window, or both, of a dwelling-house or other building, for the purpose of giving an alarm in case of an attempt to open said door or window.
1797. Charles May, of Great George-street, Westminster—Improvements in the manufacture of bricks.
1798. Richard Holme, of Kingston-upon-Hull—Improvements in the manufacture of gas.
1824. Richard Brown Roden, of Abersycham Iron-works, near Newport, Monmouthshire—Improvements in rolling iron and all other malleable metals and alloys.
1827. George Frederick Wilson, of Belmont, Vauxhall, and Alexander Isaac Austen, of Trinity place, Wandsworth-road—Improvements in the apparatus used in the manufacture of mould candles.
1838. John Hughes, of Great George-street—Improvements in building or forming structures under water, or below the surface of the ground.
1839. John Martin, of High-street, Marylebone—Invention of an improved shade for gas-burners or lamps.
1849. Moses Poole, of Avenue-road, Regent's-park—Improvements in regulating the flow and pressure of gas and other fluids. (A communication.)
1858. James Burden, of Stirling—Invention of an improved cock or tap.
1873. John Dearman Dunnicliff, of Hyson-green, Nottingham, and John Woodhouse Bagley, of Radford—Improvements in the manufacture of lace fabrics.
1908. Alexander Dalgety, of Deptford—Improvements in rotatory steam-engines.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Oct. 6 | 3519 | Lamp Candlestick ............................ | Felix Lieven Banwens ...... | Candle-works, Ranelagh-road, Pimlico. |

# SOCIETY OF ARTS.

**FRIDAY, OCTOBER 21st, 1853.**

## MEETING OF COUNCIL.

*Wednesday, Oct. 19th,* 1853.

At a Meeting of Council held on Wednesday the 19th instant, the following Institutions were taken into Union:

295. Kelvedon, Literary Institution.
296. Great Yarmouth, Parochial Library and Museum.
297. Hitchin, Mechanics' Institution.

## NOTICE TO INSTITUTIONS.

The Council have much pleasure in announcing that Mr. Seymour Tremenheere has presented fifty copies of his recent "Report on Mining Districts," and Dr. Herbert Barker (of Bedford) 150 copies of an article on "Medical Meteorology," for distribution to the Institutions in Union. As the numbers are not sufficient to admit of copies being sent to each Institution, it is requested that special application be made for the same.

## STATISTICS.

The Circular and List of Queries proposed by the Society of Arts, 25th July last, with a view to obtaining correct information as to the actual condition of the Literary and Scientific Institutions and Mechanics' Institutes of the United Kingdom, have been duly responded to by about one-third of the whole number. Many of those which have been received have evidently been most carefully filled in, and considerable time must have been occupied in procuring the requisite information for the purpose. But unless a large proportion of the remaining two-thirds are returned, it will not be possible to publish a summary of the replies in that form which was at first intended, so as to show not only the actual extent and importance of these Institutions, but also their predominance in particular districts and counties, so as to enable some deductions to be drawn as to their usefulness in promoting and advancing education.

It is earnestly desired that those Institutions which have not yet made any return to the Queries in question, will do so with as little delay as possible, and not later than the 1st of November; and that the secretaries and officers of Institutions will also urge upon others in their several localities, or to whom they may happen to be known, the importance and necessity of making the returns by the time stated.

## EXHIBITION OF INVENTIONS.

Members and others, who intend to contribute to the Fifth Annual Exhibition of Inventions, are requested to forward their models, specimens, or drawings, on or before the 1st of November next, in order that they may appear in the Catalogue.

## COMMISSIONERS OF PATENTS.

The readers of the Journal are doubtless aware that the late Patent Law Amendment Act, in addition to the sweeping away a variety of antiquated forms, tedious proceedings, reducing the fees, and making them payable by instalments, introduced the machinery of Commissioners of Patents; but many of the readers are perhaps not aware how small a part these Commissioners play in the transaction of the business. The Commissioners unfortunately have had very few duties thrown upon them by the Act; indeed, the constitution of the Commission is such, that it in reality precludes the possibility of any great amount of business being fairly attended to by its members. There is no desire to throw any blame upon them as individuals—the system alone is in fault. In the first place, all the Commissioners except one, the Master of the Rolls, change with every change of Government; there is therefore no guarantee for anything like continuous, regular, or permanent action. In the next place, every individual comprising the Commission is burthened with his own heavy official duties, which leave him practically no time whatever to devote to what ought to be the proper duties of a Commissioner of Patents, and scarcely even to the very few which the Act has imposed on him. It seems, too, as if the framers of the Act were perfectly aware of this, and have therefore studiously avoided giving them any duties whatever, which cannot properly be discharged by a few paid officers under them. The Attorney and Solicitor-General are still left to the duties of examination, and the giving their sanction to the issues of Letters-patent, and to the Lord Chancellor is left the duty of sealing when the Attorney or Solicitor-General's warrant authorizes him to do so.

It is true that the Lord Chancellor, the Attorney and Solicitor-General, are members of the Commission, but in the sealing and examination of the applications for patents they act independently of the Commission, and in their individual capacities, as hitherto. The Commission, in reality, serves for little else than to give its name to an Office where the papers are passed from one officer to another, instead of their being taken by the patentee himself, as in former times: an improvement no doubt, but one which did not require the appointment of a Commission to effect. Even this improvement, too, did not necessarily flow from the Act, but has arisen from the Lord Chancellor having seen the propriety and convenience of fixing the office for transacting his part of the business at the office of the Commissioners. Another Lord Chancellor may think differently, and divide the offices. That there is only one office for the transaction of patent business depends entirely on the will of the Lord Chancellor, who at the present time thinks it right to make one office serve the two purposes. There is one thing certainly consistent; namely, that as the Commissioners of

Patents have nothing to do, they receive no pay. One question is obvious to any one of common sense—Why is not the Patent Office made a reality and not a sham? Why is the Commission not composed of a few competent working individuals, with the requisite staff, competent not only in talent, but capable of devoting all their time to the subject, and with such salaries as will secure the best men for the purpose? The fees received from patents, the experience of one year has shown, would amply pay this cost; and to what purpose could the money be better applied?

What necessity is there for the cumbrous machinery of affixing the Great Seal of England to every grant? A practical inconvenience arises from this necessity of having the Great Seal, besides giving an excuse for mulcting the unfortunate patentee in fees beyond those sanctioned by the Patent Law Amendment Act.

The Lord Chancellor and not the Commission, having the custody of the seal, the sealing of the patent depends entirely on the former officer. Whilst he is in town certain days in the week are appointed for sealing; but in case an applicant requires his patent sealed on any other than the appointed days,—and at times this is necessary in order to save the patent,—what is termed a private seal is required, for which a patentee has to pay a fee of 2*l.* extra. By what authority the fee is exacted is not known, but usage and custom have sanctioned it for many years past. It is worse, too, in vacation or at times when the Lord Chancellor happens to be away from London. It must be remembered that the Great Seal of England is too important an affair to be left behind, but must always accompany the Chancellor wherever he goes; and any document requiring it to be affixed must in such cases be sent to the Lord Chancellor wherever he may happen to be, and in addition to the 2*l.* charge for a private seal, a sum of about 30*s.* is charged for the expense of the documents travelling backwards and forwards to that officer. Arrangements, it will be said, are made at the Patent Office for obtaining the seal during vacation one day in the week, without these extra charges, and no doubt this is so; but if the seal be required on any other day than the one appointed, then the extra charges are made. Now, no one quarrels with the Lord Chancellor for having a holiday, and there is no need here to discuss how far it may be necessary for the Great Seal of England to be kept safely guarded in the actual custody of the Chancellor. It may be, for aught that the uninitiated know to the contrary, that the Chancellor sleeps with the Great Seal under his pillow with Colt's revolvers and a drawn sword by his bed-side. The Great Seal, no doubt, is too important to be entrusted to other hands than the Chancellor himself; but, so far as Letters Patent for Inventions are concerned, there is no need of so costly and powerful an instrument to give effect to them. The simple remedy is, to make the Commission a reality, and not a sham. Appoint two or three competent men, with sufficient salaries; give them a Seal of Office, and let every Patent be sealed with this Seal; enacting by law that Letters Patent, to which such a seal is affixed, shall have the same force and effect, in all respects, as if sealed with the Great Seal.

Again, during vacation, the law officers of the Crown are constantly absent from town, and all sorts of delays and expenses are unnecessarily incurred in attending upon them; and, whilst in town, their time is so taken up with their professional and parliamentary duties, that it is impossible, be they who they may, that the Patent business can be properly attended to.

Let, then, the Commissioners have full powers to do all that is now done by the Attorney and Solicitor-General; in fact, let the Commissioners of Patents do all that is necessary for the grant of Letters Patent. There can be no difficulty in finding men competent for these duties—at least, as competent as the men who, by virtue of their office as law officers of the Crown, incidentally perform them, whether they have any special qualifications for the duties, or not. It has been gravely argued by the supporters of the old system, that as the law officers of the Crown are the future judges of the land, it is very necessary that they should gain knowledge and experience in matters relating to patents, in order that when they become judges they may be skilled in deciding such cases as may come before them. This argument, though seriously propounded, needs little refutation; as well might it be argued that every Attorney and Solicitor-General ought to spend a portion of his time as a clerk in some city house, in order to render himself a competent judge hereafter for deciding questions of mercantile law.

Common sense at once revolts at the absurdity. Let the law-officers of the Crown keep to their own legitimate business; let the Keeper of the Great Seal still retain that for the great and ponderous duties for which it may be more properly fitted. A much less important instrument will serve the purpose, as far as patents for invention are concerned. Indeed, after all, as the matter now stands, the law-officer's warrant for sealing is the really important instrument: the affixing the Great Seal by the Chancellor, is so to speak, a mere registering the edicts of the inferior officer. It is true the Lord Chancellor may at the last, on hearing sufficient reasons alleged, refuse to affix the seal, notwithstanding the warrant. That is, he may decide by way of appeal from the decision of the law officer. With a properly constituted commission such an appeal would be unnecessary; or, if thought necessary, there is nothing in the constitution of a Commission which prevents an appeal being retained under proper restrictions.

The working of the Patent Law can never be satisfactory till these anomalies are removed. Make the Commission a reality, a distinct department; put all the Patent business into its hands, and relieve the Lord Chancellor and the law officers of the Crown of their present duties, for which they can at best be only accidentally qualified.

The framers of the Patent Law Amendment Act well knew the proper machinery to be adopted; but the pressure of vested interests was no doubt too strong to enable them fully to develop its capabilities. The public, however, cannot but see the existing absurdities, and the obvious remedy—make the Commission a reality.

## METEOROLOGICAL OBSERVATIONS AT SEA.

A Conference was recently held at Brussels, at the invitation of the Government of the United States of America, the object of which was to connect a systematical and uniform plan of meteorological observations at sea. The Conference at Brussels was held with the view of attracting the attention of commercial nations to the subject, and the Report which follows was the result of it:

"In pursuance of instructions issued by the Governments respectively named below, the officers whose names are hereunto annexed assembled at Brussels for the purpose of holding a Conference on the subject of establishing a uniform system of meteorological observations at sea, and of concurring in a general plan of observation on the winds and currents of the ocean, with a view to the improvement of navigation, and to the acquirement of a more correct knowledge of the laws which govern those elements. The meeting was convened at the instigation of the American Government, consequent upon a proposition which it had made to the British Government, in reply to a desire which had been conveyed to the United States, that it would join in a uniform system of meteorological observations on land, after a plan which had been prepared by Captain James, of the Royal Engineers, and submitted to the Government by Sir J. Burgoyne, Inspector-General of Fortifications. The papers connected with this correspondence were presented to the House of Lords on the 21st of February last, and have been further explained in the minutes of the Conference. And it is here merely necessary to observe, that some difficulties having presented themselves to the immediate execution of the plan proposed by the British Government, the United States availed themselves of the opportunity afforded by this correspondence of bringing under the notice of the British Government a plan which had been submitted by Lieutenant Maury, of the United States' navy, for a more widely extended field of research than that which had been proposed; a plan which, while it would forward the object entertained by Great Britain, would, at the same time, materially contribute to the improvement of navigation and to the benefit of commerce.

"An improvement of the ordinary sea route between distant countries had long engaged the attention of commercial men, and both individuals and nations had profited by the advances which this science had made through a more correct knowledge of the prevailing winds and currents of the ocean. But experience had shown that this science, if it did not now stand fast, was at least greatly impeded by the want of a more extended co-operation in the acquirement of those facts which were necessary to lead to a more correct knowledge of the laws which govern the circulation of the atmosphere, and control the currents of the ocean; and that the subject could not receive ample justice, nor even such a measure of it as was commensurate with the importance of its results, until all nations should concur in one general effort for its perfection. But, could that happy event be brought about—could the observations be as extensive as desired, and receive that full discussion to which they were entitled, the navigator would learn with certainty how to count upon the winds and currents in his tract, and to turn to the best advantage the experience of his predecessors.

"Meteorological observations to a certain extent had long been made at sea, and Lieutenant Maury had turned to useful account such as had from time to time fallen into his hands; but these observations, although many of them good in themselves, were but isolated facts, which were deprived of much of their value from the absence of observations with which they could be compared; and, above all, from the want of a constant and uniform system of record, and from the rudeness of the instruments with which they had been made. The moment then appeared to him to have arrived when nations might be induced to co-operate in a general system of meteorological research. To use his own words, he was of opinion that 'the navies of all maritime nations should co-operate, and make these observations in such a manner, and with such means and implements, that the system might be uniform, and the observations made on board one public ship be readily referred to, and compared with the observations made on board all other public ships, in whatever part of the world; and, moreover, as it is desirable to enlist the voluntary co-operation of the commercial marine, as well as that of the military of all nations, in this system of research, it becomes not only proper, but politic, that the forms of the abstract log to be used, the description of the instruments to be employed, the things to be observed, with the manipulation of the instruments, and the methods and modes of observation, should be the joint work of the principal parties concerned.'

"These sentiments being concurred in by the Government of the United States, the correspondence between the Governments was continued, and finally each nation was invited to send an officer to hold a Conference at Brussels on a given day. And that the system of proposed observation and of combined action might become immediately available, and be extended to its widest possible field of operation, it was determined to adapt the standard of the observations to be made to the capabilities of the instruments now in general use in the respective naval services, but with the precaution of having all these instruments brought under the surveillance of parties duly appointed to examine them and determine their errors; as this alone would render the observations comparable with each other through the medium of their respective standards.

"The Conference opened its proceedings at Brussels on the 23rd of August, 1853, in the residence of M. Piercot, the Minister of the Interior, to whom the thanks of the Conference are especially due. M. Quetelet was unanimously elected president.

"Before entering upon any discussion, it was the desire of all the members of the Conference that it should be clearly understood that in taking part in the proceedings of the meeting they did not in any degree consider themselves as committing their respective Governments to any particular course of action, having no authority whatever to pledge their country in any way to these proceedings. The objects of the meeting having been explained by Lieutenant Maury, the Conference expressed its thanks to that officer for the enlightened zeal and earnestness he had displayed in the important and useful work which forms the subject of the deliberations of the Conference.

"In concerting a plan of uniform observation, in which all nations might be engaged, the most obvious difficulty which arose was from the variety of scales in use in different countries. It is much to be desired that this inconvenience should be removed; but it was a subject upon which the Conference, after mature deliberation, determined not to recommend any modification, but to leave to each nation to continue its scales and standards as heretofore, except with regard to the thermometers, which it was agreed should, in addition to the scale in use in any particular service, have that of the centigrade placed upon it, in order to accustom observers in all services to its use, with a view to its final and general adoption. The advantages of concert of action between the meteorologist on land, and the navigator at sea, were so obvious, that looking forward to the establishment of a universal system of meteorological observation upon both elements, it was thought that the consideration of scales could with greater propriety be left for that or some such occasion.

"As to the instruments to be recommended, the conference determined to add as few as possible to such as were in common use in vessels of war; but, regarding accuracy of observation as of paramount importance, the conference felt it to be a matter of duty to recommend the adoption of accurate instruments, of barometers and thermometers especially that have been carefully compared with recognized standards, and have had their errors accurately determined; and that such instruments only should be used on board every man-of-war co-operating in this system, as well as on board any merchantmen, as far as it may be practicable. The imperfection of instruments in use at sea is notorious. The barometer having hitherto been used principally as a monitor to the mariner—to warn him, by its fluctuations, of the changes in prospect—its absolute indication of pressure has been but little regarded; and makers seldom, if ever, determined the real errors of these instruments; or, if known, still more rarely ever furnished the corrections with the instruments themselves. That an instrument so rude and so abundant in error as is the marine barometer generally in use should, in this age of invention and improvement, be found on board any ship, will doubtless be regarded hereafter with surprise; and it will be wondered how an instrument so important to meteorology, and so useful to navigation, should be permitted to remain so defective that meteorologists, in their investigations concerning the laws of atmospheric pressure, are compelled in great measure to omit all reference to the observations which have been taken with them at sea. The fact will, it is believed, afford a commentary upon the marine barometers now in use which no reasoning or explanation can render more striking. It was the opinion of the conference that it would not be impossible, considering the spirit of invention and improvement that is now abroad in the world, to contrive a marine barometer, which might be sold at a moderate price, that would fulfil all the conditions necessary to make it a good and reliable instrument; and a resolution was passed to that effect, in order to call the attention of the public to the importance of an invention which would furnish the navigator with a marine barometer that at all times, and in all weathers at sea, would afford the means of absolute and accurate determinations. The Conference is also of opinion that an anemometer, or an instrument that will enable the navigator to measure the force, velocity, and direction of the wind at sea, is another desideratum. The Conference was of opinion, that the mercurial barometer was the most proper to be used at sea for meteorological purposes, and that the aneroid should not be substituted for it.

"With regard to thermometers, the Conference does not hesitate to say, that observations made with those instruments, the errors of which are not known, are of little value; and it is therefore recommended, as a matter well worth the attention of co-operators in this system of research, whether some plan may not be adopted in different countries for supplying navigators, as well in merchantmen as in men-of-war, with thermometers, the errors of which have been accurately determined. For the purposes of meteorology, various adaptations of the thermometer have been recommended, such as those which refer to hygrometry and solar radiation; and, accordingly, a space will be found in the columns for temperature by thermometers with dry, wet, and coloured bulbs. With these exceptions, the only instrument, in addition to those generally used at sea, for which the Conference has thought proper to recommend a column, is that for specific gravity: the cost of this instrument is too insignificant to be mentioned. The reasons for recommending the use at sea of the wet, the white, and black bulb thermometers are obvious; but with regard to the thermometer with a bulb, the colour of sea-water, and the introduction on board ship of a regular series of observations upon the specific gravity of sea-water, it may be proper to remark that, as the whole system of ocean currents and of the circulation of sea-water depends in some degree upon the relative specific gravities of the water in various parts of the ocean, it was judged desirable to introduce columns for this element, and to recommend that observations should be carefully made with regard to it, both at and below the surface. With respect to the thermometer having a bulb of the colour of sea-water, it is unnecessary to say more in favour of its use on board ship than that the object is to ascertain whether or no such observations will throw any light upon the psychrometry of the sea, or upon any of the various interesting phenomena connected with the radiation from the surface of the ocean.

"In bringing to a conclusion the remarks upon instruments, the Conference considered it desirable, in order the better to establish uniformity and to secure comparability among the observations, to suggest, as a measure conducive thereto, that a set of the standard instruments used by each of the co-operating Governments, together with the instructions which might be given by such Governments for their use, should be interchanged.

"The object of the Conference being to secure as far as possible uniformity of record, and such a disposition of the observations that they would admit of a ready comparison, a form of register was concerted and agreed upon. The first columns of this form will receive the data which the Government of the United States requires merchant vessels to supply, in order to entitle them to the privileges of co-operators in the system of research, and may therefore be considered as the *minimum* of what is expected of them. This condition, which it may be as well to state here, requires that at least the position of the vessel and the set of the current, the height of the barometer, the temperature of the air and water, should each be determined once a day, the force and direction of the wind three times a day, and the observed variation of the needle occasionally.

"Every abstract log kept by a merchant vessel should contain at least what is here recommended. Anything more would enhance its value, and make it more acceptable. The remaining columns are intended principally for men-of-war to fill up, in addition to those above-mentioned; but it is believed that there are many officers in the mercantile navy also who are competent to the undertaking, and who will, it is hoped, be found willing to distinguish themselves in this joint action for the mutual benefit of the services. In the compilation of the form, the Conference has had carefully in view the customs of the service and the additional amount of attention which these duties will require; and it is believed that the labour necessary for the purpose, at least to the extent specified in the instructions for filling up the columns, is only such as can be well performed under ordinary circumstances; and it has considered it a *minimum*, and looks with confidence to occasional enlarged contributions from zealous and intelligent labourers in the great cause of science. The directions for filling up the columns, and for making certain observations, it will be seen by the minutes, were limited to such only as seemed necessary to the Conference to insure uniformity of observation. This subject received the benefit of much discussion before the meeting, and it was considered most advisable to confine the matter to hints, which it is hoped will be found sufficient, when embodied in the instructions which each nation will probably issue with the forms, to ensure that most desirable end, uniformity.

"The Conference, having brought to a close its labours with respect to the facts to be collected and the means to be employed for that purpose, has now only to express a hope that whatever observations may be made will be turned to useful account when received, and not be suffered to lie dormant for the want of a department to discuss them; and that should any government, from its limited means, or from the paucity of the observations transmitted, not feel itself justified in providing for their separate discussion, it is hoped that it will transfer the documents, or copies of them, to some neighbouring power, which may be more abundantly provided, and willing to receive them. It is with pleasure that the Conference has learnt that the Government of Sweden and Norway has notified its intention of co-operating in the work, and that the King has commanded the logs kept by his Swedish subjects to be transmitted to the Royal Academy of Science at Stockholm; and also that in the Netherlands, Belgium, and Portugal, measures have been taken to establish a department for the same purpose, and that the Admiralty of Great Britain has expressed its intention of giving instructions for meteorological observations to be made throughout the Royal Navy.

"The Conference has avoided the expression of any opinion as to the places or countries in which it would be desirable to establish offices for the discussion of the logs; but it is confidently hoped that whatever may be done in this respect, there will be always a full and free interchange of materials, and a frequent and friendly intercourse between the departments; for it is evident that much of the success of the plan proposed will depend upon this interchange, and upon the frankness of the officers who in the several countries may conduct these establishments.

"Lastly, the Conference feels that it would but inadequately discharge its duties did it close this Report without endeavouring to procure for these observations a consideration which would secure them from damage or loss in time of war, and invites that inviolate protection which science claims at the hands of every enlightened nation; and that as vessels on discovery or scientific research are, by consent, suffered to pass unmolested in time of war, we may claim for these documents a like exemption, and hope that observers, amid the excitement of war, and perhaps enemies in other respects, may in this continue their friendly assistance, and pursue their occupation, until at length every part of the ocean shall be brought within the domain of philosophic research, and a system of investigation shall be spread as a net over its surface, and it become rich in its benefit to commerce, navigation, and science, and productive of good to mankind.

"The members of the Conference are unwilling to separate without calling the attention of their respective Governments to the important and valuable assistance which it has received from the Belgian Government. That the Conference has been enabled to draw its labours to so speedy and satisfactory a close, is in a great measure owing to the facilities and conveniences for meeting and deliberating which have been afforded by His Majesty's Government.

"Signed at Brussels, this 8th day of September, 1853.

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| "Belgium . . . . | QUETELET, *President.*<br>LAHURE. |
| "Denmark. . . . | P. ROTHE. |
| "France . . . . . | DELAMARCHE. |
| "Great Britain . | F. W. BEECHEY,<br>H. JAMES. |
| "Netherlands. . | JANSEN. |
| "Norway . . . . | IHLEN. |
| "Portugal. . . . | DE MATTOS CORREA. |
| "Russia . . . . . | GORKOVENKO. |
| "Sweden . . . . | PETTERSSON. |
| "United States . | MAURY." |

## CONSUMPTION OF SMOKE.

MR. HAYWOOD, the surveyor to the City Commissioners of Sewers, has just made the following Report on this subject. He says:

"I have caused observations to be made of the issue of opaque smoke from the chimney shafts belonging to the brewery of Messrs. Calverts, in Upper Thames-street. The chimney shafts were watched for a period of seven days, from about four o'clock a.m. until seven or eight p.m., an observation being registered every ten minutes. The total number of observations registered was 671; of which 7 record no smoke visible, 85 the smoke scarcely visible, 135 perfectly visible, 193 rather dense, 251 exceedingly dense. Thus about 34 per cent. of the whole number of observations record the issue of exceedingly dense smoke, and 66 per cent. of the whole as dense and exceedingly dense. There are several large chimney shafts to this establishment, the whole of which were watched. The number which were in use at the time varied. The duration of the period of the issue of exceedingly dense smoke was from one to seven minutes, the average appearing to be about three or three and a half minutes; and it may therefore be said to be issuing from Messrs. Calverts' premises for more than two hours daily, and smoke of the two highest degrees of density must have been issuing for nearly half of the busy hours of the day. The smoke from the chimney shaft of the City Flour Mills, situated in Upper Thames-street, having occupied the attention of your honourable Court, I have also directed similar observations to be made there. These observations were continued for six days, between four o'clock a.m., and eight o'clock p.m., and the observations were likewise at intervals of ten minutes noted. The total number registered was 377; of which 21 record the smoke as not visible, 204 scarcely visible, 73 visible, 37 rather dense, 42 exceedingly dense. The duration of the periods of intense smoke was about three and a half or four minutes. About 11 per cent., therefore, of the whole number of observations record the issue of the smoke as exceedingly dense, and 21 per cent. of the whole as of the two highest degrees of density. The persons who took these observations made no inquiry as to the time when the furnaces were lighted or extinguished, nor was information conveyed to the owners that the issue of smoke from the chimneys was being watched.

"The general practicability of almost entirely preventing the issue of opaque smoke from furnace shafts is now so universally admitted, that I need scarcely here re-assert that it can be accomplished; yet as it appears probable that before long it may be requisite for you to enforce the abatement of the nuisance by the owners of those furnaces within your jurisdiction who have not yet complied with your notices, it may be useful to submit to you a few points in connection with the subject.

"From the earliest period of the usage of coal as a fuel in the metropolis, the smoke caused by its imperfect combustion appears to have been regarded as a great evil, and in 1819 a select committee of the House of Commons, termed the 'committee on steam engines and furnaces,' was appointed to inquire 'how far it may be practicable to compel persons using steam engines and furnaces in their different works, to erect them in a manner less prejudicial to public health and public comfort;' it was, in fact, to inquire into the practicability of preventing the issue of opaque smoke, and the committee having elicited the opinions of qualified judges, appear to have arrived at the conclusion that the nuisance might at least be considerably diminished, if not altogether removed.

"In 1843, a select committee of the house, and in 1845, another select committee was appointed on smoke prevention. From them the subject received the fullest investigation; a large amount of evidence being taken from numbers of witnesses, in every way competent, from their scientific and practical knowledge, to give information, and it resulted in the most confident expression of opinion from those committees in the practicability of economically preventing the issue of opaque smoke from furnaces and steam engines; and the Health of Towns Commission, in 1845, concurred in this opinion, and in the propriety of an immediate legislative enactment upon the subject.

"In the year 1846, Sir Henry De la Beche and Dr. Lyon Playfair, who were specially charged by the Government with inquiring into the question of smoke consumption, reported its almost universal practicability, appearing indeed to except only certain descriptions of furnaces, where, from the nature of the manufactures, combustion is effected under peculiar and special circumstances, hindering the application of those principles upon which the effectual prevention of opaque smoke depends.

"The whole of these commissions of inquiry may be said then to have concurred in opinion as to the practicability of smoke prevention, their opinions being formed and matured after hearing evidence from the most competent witnesses who could be found. The result of these various investigations has been that local acts for suppressing the issue of opaque smoke have been obtained by Manchester and Liverpool, Derby, Birmingham, and other provincial towns, at some of which places the smoke has been prevented to a very large extent. The first act for the prevention of the nuisance within the metropolis was obtained and put into operation within the City of London in 1852, and up to the present time notices have been served by this commission upon the owners of about 120 furnaces, and the issue of smoke has been from the majority of these considerably abated, although in all cases the abatement has not yet been so perfect as may be practicable, or as the act appears to require. These 120 furnaces comprise the whole of those within the City, the chimneys of which formerly vomited forth the densest volumes of opaque smoke.

"The practicability of consuming smoke is, therefore, no longer a matter of speculation, as within your own jurisdiction various successful instances may be appealed to, and in some of the provincial towns named they are both numerous and remarkable. There is, however, one metropolitan example worthy of special reference, and if any doubts still exist upon the point, I think that a visit to the brewery of Messrs. Truman, Hanbury, Buxton, and Co., Brick-lane, Spitalfields, would be most convincing. I have myself visited the establishment, and can personally testify to the almost perfection of combustion and freedom from smoke which are attained there. There are fourteen furnaces connected with twelve chimney shafts upon that establishment, which are fitted up with smoke-consuming apparatus. The first furnace was fitted up experimentally early in the year 1848, and its complete success caused the gradual introduction of the principle to the remaining furnaces. There are generally thirteen furnaces at work daily, and the consumption of coals is about 6,000 tons per annum. The total cost of fitting up the furnaces was about 3,000*l.*, and the annual expense of repairs about the same as it was to the furnaces before their alteration. These details have been obligingly given to me by Mr. Frazer, the engineer to the brewery. At the time of my visit (which no one could have anticipated, as, until presenting myself at the office and requesting permission to inspect the furnaces, I had not signified my intention to any one) I found most of the furnaces at work; but the smoke was scarcely visible from any one of the chimney shafts: and from some of them so slight was the issue, that it was not easily ascertainable whether the furnaces connected with them were at work or not, although that such was the case I afterwards verified; and when I looked up through two shafts, which are about 70 feet high, from the door by the furnace mouths, so free were they from smoke that although one furnace was consuming at the rate of 3 tons of coal per diem and the other at the rate of about 10 cwt. per diem, the sky was perfectly visible; and birds, had they been flying over the tops, might have been distinctly seen. I was informed that this freedom from opaque smoke was maintained throughout the day, with the exception of two or three occasions of about four minutes each, when from processes in the brewing the fires required temporarily suppressing, and that the smoke was perfectly consumed within a quarter of an hour after the furnaces were ignited in the morning. I think that I can add nothing more in verification of the practicability of consuming opaque smoke, and the gratuitous and disinterested public communication recently made by Messrs. Truman, Hanbury, and Co., that this smoke consumption has enabled them to effect a saving of about 2,000*l.* per annum, must place the economy of effecting a perfect combustion beyond doubt, and most certainly so in the case of establishments at all parallel in extent and other conditions. That there is no loss sustained by the adoption of means for consuming smoke abundant testimony is to be gathered from the provincial towns before named.

"There are various causes for the production of opaque smoke from furnaces; irregular and careless firing, over stoking, want of draught, &c., may each cause it, as well as the urging of the furnaces, and forcing the boilers beyond their legitimate powers (one which, I apprehended, would upon inquiry be found to have been a most fertile cause within your jurisdiction). The cures, therefore, will be more or less difficult and expensive, and must be sought in the application of one or other of those remedies of which there are now many, and which must be applied according to the exigencies of particular cases; but with the causes of smoke, as with the modes of cure, I need not detain you, for as the practicability of its prevention is now an established fact, the business of the commission as regards smoke may be almost said to be with the tops of the chimney shafts alone, from which it is perfectly manifest that with proper appliances and sufficient care opaque smoke need issue but for a very few minutes daily, the chimneys of those manufactories where the combustion of fuel is made under peculiar circumstances being alone exceptional."

## ARTIFICIAL PEARLS.

An oyster, or rather a water muscle, in which the artificial pearls are formed by the Chinese, has recently been sent to this country. These pearls are only obtained near Ning-po, and until lately very little was known of the manner in which they were formed. The *Hermes* steamer, however, on a late visit to that place, was able to obtain several live ones, in which, on being opened, several pearls, as many as eighteen or twenty, were found in the course of formation. The one sent only contains simple pearls adhering to the shell. It appears they are formed by introducing some pieces of wood, or baked earth, into the animal while alive, which, irritating it, causes it to cover the extraneous substance with a pearly deposit. Little figures made of metal are frequently introduced, and, when covered with the deposit, are valued by the Chinese as charms. These figures generally represent Buddha in the sitting posture, in which that image is most frequently portrayed. Several specimens have, it is said, been preserved alive in spirits, and others slightly opened, so as to show the pearls. The Society has reason to believe that it will shortly receive a more detailed statement, accompanied with specimens, in reference to this interesting fact.

## TRADE SCHOOLS.

The Rev. Henry Moseley, M.A., F.R.S., Canon of Bristol, and one of Her Majesty's Inspectors of Schools, has just addressed a letter to the Committee of the Bristol Diocesan Society, on the best means of giving efficiency to the Bristol Diocesan School, in which the following passages occur:

"The school having been established for the benefit of education generally in Bristol, it occurs to me that—under circumstances which appear in some measure to have superseded its use as an ordinary elementary school, of the same description as the parochial schools which surround it,—it would be expedient to offer in it a course of instruction of a different kind from the instruction given in those schools, and to make it supplementary to them. What I propose will perhaps better be understood if I remind you of the fact that in ordinary national schools there are commonly some boys in advance of the rest, and capable of receiving instruction of a higher kind, which could not be given to them without occupying more of the time of the master than is compatible with the general routine of the school, and probably with the objects of the promoters. It would, I think, be a useful function of the Diocesan schools to offer to this class of boys, in a separate school, a special course of instruction of a practical kind, having reference to the mechanical and manufacturing callings and the trade of Bristol.

"The attention of the public has been directed (as the Committee will probably remember) to the subject of trade schools by various public meetings held at the Society of Arts, by a conference of the representatives of the municipal towns, at the Mansion-house in London, and by the establishment of a department of the Board of Trade specially for the encouragement of schools of this class.

"To ascertain how far there is occasion for the establishment of a trade school in Bristol, and what means the city supplies of supporting it, I have referred to the Bristol Directory, and counted up the number of manufacturers, tradesmen, and master-workmen, the principles of whose manufacturing or mechanical pursuits or trade require—to be thoroughly understood—a knowledge of certain elementary principles of science which might be taught in a trade school; and I find the number to be 1708.

"This list I have divided into three groups. The first contains the trades, 18 in number, which are connected with building. There are 750 tradesmen in this group. The department of School instruction adapted to youths intended for any of the trades composing it, will be understood by a reference to the 'Builders' Price Book.' It is sufficient to say that youths might, at such a school as I propose, be thoroughly familiarised with measuring, and made to acquire facility, precision, and accuracy, in all the various calculations referred to in that book; and might further be made to comprehend the principles on which those calculations are founded. If in addition to this acquirement they were instructed in levelling, in geometrical drawing, in taking plans, and in those principles of experimental science which are connected with ventilation and sewerage, and with the lighting and heating of buildings, they could not fail to enter on the trade of the builder with great advantages to themselves and to the public, as compared with other persons who have received no such previous instruction.

"The second group contains 72 trades, giving occupation to 600 manufacturers or tradesmen, whose pursuits come under the general designation of mechanical pursuits, and require—that the principles on which they depend may be understood—an elementary knowledge of mechanism, and of the science of practical mechanics.

"The third group includes 62 trades or manufactures, giving occupation to 358 manufacturers, or tradesmen, dependent upon the experimental sciences, and, more particularly, upon chemistry; of which science each is, in fact, little more than an application.

"I am far from alleging that a knowledge of these various branches of science is necessary for carrying on the different trades which I have enumerated. But I do allege that if carried on, in ignorance of such branches of science, they are carried on in ignorance of the principles on which they rest; and that whoever so carries them on, misses that opportunity for the improvement of his mind which is supplied by the daily habit of reasoning and understanding on what he is about; that he fails of one of the highest pleasures of which the human mind is capable—that of thus reasoning and understanding; and that he is wanting in that which is a legitimate source of moral dignity and self-respect. I allege further, that, taken collectively, these trades cannot but suffer, in a commercial point of view, from an ignorance on the part of those who carry them on, of the principles on which they depend—it being impossible but that new and improved processes of art and manufacture and expedients of construction should result from such knowledge.

The Rev. Mr. Moseley then goes on to recommend that a navigation school should be united with the trade school, as having a direct bearing upon the trade of Bristol; and states, that "the experience of the Royal Naval

Schools at Greenwich Hospital has shown that a sound knowledge of this science, in theory and in practice, may be communicated to boys of fifteen years of age;" and that by this knowledge they become better conducted and more efficient sailors than they otherwise would be. It is recommended that the school should be thrown open generally to the inhabitants of Bristol, as small tradesmen, the higher class of mechanics, warehousemen, &c., &c., whose children may not have attended national schools, would be likely to avail themselves of it.

With reference to the expenditure requisite for the establishment and maintenance of the school, Mr. Moseley states, that that department of the Board of Trade, which is specially established for promoting this class of schools, will supply the requisite diagrams, models, &c., at half price. "The Committee of Council on Education has also offered to elementary schools under inspection—and will probably extend to trade schools, constituted as *this* is proposed to be, as *advanced national schools*,—grants for the purchase of philosophical apparatus, to the extent of two-thirds of the cost;" and "will also probably give a grant in aid of *alterations* in internal arrangements, desks, fittings, and augmentations of salary to the masters, provided that they have received its certificates; and it will give stipends for the support of apprenticed pupil teachers." The probable scale of expenditure would be: Salary of head master, 100*l.* and house; salary of second master, 80*l.*; incidental expenses, 40*l.*—total, 220*l.* The services of occasional teachers, in addition to those constantly employed, would be necessary, as the present masters do not possess the *technical knowledge* which such a school would require. The arrangement which, under these circumstances, would, perhaps, be found practically the best, would be to seek a head master who, besides being a good teacher and school-keeper, should have a general knowledge of experimental science and of practical mechanics. The second master should be obtained from the Greenwich Hospital schools, where there is a body of pupil teachers training to become masters of navigation schools. He would teach the navigation class; and, as he would be a good mathematician, he could, so long as the numbers are small, take besides this class, the class of the trade school corresponding to the first group of trades, those connected with building, whilst the head master took the other two groups.

For certain technical branches of instruction, and especially in the commencement of the school, occasional teachers would be necessary. In regard to the building trades, "A young architect or surveyor, who could spare an hour two or three times a week, to attend at the school, to give a short lecture in explanation of practical details, would fully answer the purpose. All the rest would be done by the head and second masters. The same is true of the trades and manufactures included under the other groups, except that no single person would certainly be found capable of explaining the practical details of all the trades in either of these groups; although in each group different individuals would probably be found willing to give lectures in their own specialities. The best way of providing for this technical instruction, would, I think, at first be to fix a certain sum as the remuneration of each lecture or lesson, and to embrace such opportunities as might arise of getting competent persons to give such lessons. The sum so fixed might be ten shillings. To provide for the expense of these technical lessons, the guarantee offered by the Board of Trade might be asked. If two such lessons were given in each group of trades per week, the cost would be (taking forty weeks in the school year) 120*l.* per annum. For the mathematical, the mechanical, and the experimental sciences, which are the basis of all these trades, the masters permanently employed in the school must be held responsible. If, as is probable, the Committee of Council consent to apprentice pupil teachers in the school, or to allow stipends to assistant teachers; one of these should be employed by each lecturer or master, as, what is called, a repeater (*repetiteur*) in the French schools. He is an officer whose business it is to assist at every lecture, to make himself thoroughly master of it, aided by the lecturer's explanations and notes, and to reproduce or repeat it to the class, giving them fuller explanations, impressing it more fully on their minds, and, as it were, compelling the reception of it. It is to be understood that the salaries of these pupil teachers would be paid altogether, and those of the assistant teachers in part, by the Committee of Council. One part of the day (probably the afternoon) should be devoted exclusively to technical and the other to general scientific instruction.

"An educational standard should be fixed for admission; which, for the present, may be reading, writing, and arithmetic as far as the rule of three. The fee should, I think, be sixpence per week, or five shillings per quarter, for the sons of workmen and tradesmen not employing journeymen, and one shilling a week, or ten shillings per quarter, for the sons of persons above that grade.

"The number of separate establishments in Bristol, in which trades or manufactures, in some degree dependent on scientific principles, are carried on, being 1,708, and some of these employing upwards of a hundred men—it is not perhaps too much to assume that, connected with each, there would on the average be not less than three persons in a condition to avail themselves, for their children, of the education of the trade school, and who would derive benefit from doing so. If we include in this number those persons who, although not themselves employed in these trades or manufactures, are desirous that their sons should be employed in them, it is, I think, certain that this estimate is not in excess. This will give 5,124 heads of families interested in the school, and in a position to benefit by it. It is not too much to assume that 150 boys would be collected from 5,124 families. Fifty scholars might also not unreasonably be calculated upon for the navigation school, which would give a total of 200 scholars. The fees of these scholars, at an average of 9*d.* per week each, would amount to 300*l.*, and this with the present funds of the school, if continued, would probably provide for its maintenance.

"In conclusion, I am desirous to call the attention of the Committee to the benefits which the surrounding National-schools may be expected to derive from the establishment of the Trade-school. As, in the course of time, tradesmen, masters of ships, &c., might be expected to give the preference to boys educated in this school; to obtain an exhibition to it, could scarcely fail to be considered among the boys of a National-school a reward. Thus a motive to remain longer at school would be afforded; and a public opinion of the school favourable to learning, as a means of advancement in life to a poor boy, would be created. The character of the instruction in the National-schools of Bristol could scarcely, moreover, fail to be influenced by that of the trade school, receiving from it a more useful and practical bearing upon the pursuits of workmen, and the objects amongst which their lives are passed, so as to cause the occupations of after life to carry on the education of their minds which was commenced at school, and which at present ceases altogether with school, their school-life being wholly unconnected with the avocations which follow it. The name of the school should, I think, be "The Bristol Trade and Navigation School." It would be expedient eventually to establish an evening trade school and an evening navigation school. But another staff of masters would be required for this, and a distinct expenditure. It would be impossible that the same master could teach both schools so as to do justice to them."

## HOME CORRESPONDENCE.

### ON THE PRESERVATION OF GRAIN.

> "When in one night, ere glimpse of morn,
> His shadowy flail hath thresh'd the corn
> That ten day-labourers could not end."

Sir,—The mode adopted in this country for storing and preserving the produce of our yellow crops is extremely rude and slovenly; and is, no doubt, the same as it was in the dark and semi-barbarous ages when bricks and mortar were rarely used, excepting for the castles and mansions of the old feudal barons.

In passing through any of our great agricultural districts it will be seen by the most superficial observer, that farmers either on a large scale, or in the small way, are but poorly provided with barn room. The barn, now as formerly, is merely a covering for the old-fashioned threshing-floor, and is capable of containing but a very small portion of the crop, the whole of which, with that trifling exception, is stored outside in the shape of wheat ricks, barley mows, and oat stacks, exposed to all the inclemency of our very variable climate, and liable, beside, to be destroyed wholesale by all manner of vermin. At the present time, notwithstanding the vast increase of agricultural produce, the barn remains still of the same dimensions, with a forest of stacks and ricks, wholly unprotected from weather and vermin, for four or five years.

The only mode of storing and preserving corn, compatible with true economy, is in its clean state on a granary floor so constructed with proper traps and hoppers, that the grain may be quickly and easily swept down into winnowing machines below, and thence hoisted up to another floor previously cleaned and whitewashed. For new grain it would be requisite to perform this operation about once in every three weeks for the first two or three months, but afterwards twice or thrice a year would be quite sufficient. The expense of the granary and manual labour would be amply compensated in three or four years, by getting rid of the enormous loss necessarily attendant on the rick system. We constantly hear of thousands of rats dead and alive being found by farmers on opening their ricks, which are not unfrequently in such a pestilential state that the owners would willingly set fire to them if it were not for fear of the surrounding property, and it has happened that a man in attempting to remove the thatch of an old rick, has fallen through to the floor, nothing being left of the rick but an empty shell.

Unfortunately, actual loss of corn is not the only mischievous result of the rick system. We are always complaining of the rascally bakers for supplying us with bad bread; but what can they do, while the farmers and millers together supply them with flour made from overheated wheat, browned with age, rottenness, and rats—and seasoned with the putrid carcases of themselves and their enemies? To convert such stuff into white, I cannot say wholesome, bread, the bakers must use large quantities of alum, and throw in plenty of ammoniacal and alkaline mixtures to make it rise: but let any one procure some newly-reaped wheat, and have it ground pure by itself, *if he can*, and he will find that the flour of such wheat will produce bread as white as snow, and as light as puff-paste without any chemicals whatsoever.

It is true, that bakers use flour made from the oldest wheat in preference to that made from new, because flour made from old wheat requires more water to make up the dough; and it is to the interest of the baker to sell as much water in proportion to the flour as he possibly can. No great harm would result from this practice, if the wheat had grown old on the granary floor, but not in the wheat-rick. I have eaten good bread made from wheat fifty years old, preserved in the magazine granary of a fortress.

As it would be preposterous to suppose that barns could be built of sufficient capacity to receive the whole produce of a farm in the straw, the rick system must be continued; only the farmers must be prepared with powerful steam threshing machines (now, happily, quite common), and thresh out the whole of their crops as soon as possible after reaping, and store their corn in granaries, one of which might serve several neighbouring farms.

It is melancholy to think that the price of bread, the staff of life to the poor, should be enhanced by such slovenly management; but the farmers are not alone to blame, seeing that hundreds, nay, sometimes thousands of quarters of corn are annually shot into the Thames, from the numerous granaries up and down the river banks; partly from mismanagement and improper corn stores, as well as from an idea that the increased price of the better sorts may more than compensate for the loss upon inferior. I am, Sir, yours obediently,

Henry W. Reveley.

Poole, Oct. 20th.

## PROCEEDINGS OF INSTITUTIONS.

Basingstoke.—The commencement of the thirteenth Lecture session of the Mechanics' Institute took place at the Town-hall on Wednesday, 12th inst., when the opening lecture was delivered by the Rev. Joseph Wyld, of Southampton, on the "Life and Character of William Penn." The reverend gentleman pourtrayed the principal characteristics which distinguished Penn during a long and eventful life, pointing out with what fearless moral courage and perseverance he successfully combated the many trials and persecutions which assailed him, and his religious principles under the most trying and distressing circumstances. The Lecturer also explained the unceasing exertions of Penn to be "useful in his generation," and his anxious endeavour to assist and ameliorate the condition of his fellow-man, irrespective of country or creed; boldly coming forth as the champion of freedom of thought, and the unflinching advocate of civil and religious liberty throughout the world, at a time when bigotry and intolerance persecuted and imprisoned all who dared to think and act for themselves in matters of religious faith.—A special general meeting was held on Thursday evening for the purpose of electing a President, in the room of Edw. Lefroy, Esq., whose protracted illness obliged him to resign that office, after holding it since the establishment of the Institute in 1841. Wyndham Portal, Esq., of Maltshanger House, was unanimously elected to the vacant chair.

Blairgowrie.—The Introductory Lecture of a course in connection with the Blairgowrie and Rattray Mechanics' Institution was delivered here on Tuesday, the 11th October, by the Rev. J. S. Barty, D.D., of Bendochy, who had chosen for his subject, "The Mind, and how to use it." The rev. gentleman was introduced to the audience by the President, and riveted the attention of a numerous assembly by the power, clearness, and pathos of his lecture. The course of lectures at this Institution are given gratuitously by clergymen and gentlemen in or near the locality, which shows what may be done even in a thinly-populated country, if local talent is enlisted in behalf of such societies.

Brighton.—The Sixth Course of Lectures at the Mechanics' Institution was commenced on Thursday evening, 13th inst., when Mr. C. J. Bond, Vice-President, gave an interesting lecture on the "Influence of Music," assisted, in the vocal department, by Mrs. Bond and Mr. J. Marshall, whose execution of the various duets and songs, &c., called forth the applause of a numerous audience. The Chairman, Mr. Cordy Burrows, in his opening remarks, alluded to the sad loss the Society had sustained in the death of the Rev. F. W. Robertson, to whom much of the present prosperity of the Institution was owing. The Society was stated to be in a most prosperous condition, the number of its members being rapidly increasing. The Library contains 2,200 volumes, and the circulation of books during the last six months exceeded 4,000 volumes.

Chichester.—On Wednesday, the 12th instant, the introductory Lecture of the session was delivered before the members of the Literary Society and Mechanics' Institute, by the Rev. J. Fullagar, "On Light: its Laws, and Properties." The Lecturer prefaced his subject by remarking that he had cheerfully responded to the invitation of the Committee to open the present session, in order that he might demonstrate that the interest he felt in the present amalgamated Society was not less active and real than that he had always manifested in regard to the success of the original Mechanics' Institution; and that he had selected the subject of "Light" for their consideration, as he was anxious to introduce something of a scientific character into the course of lectures, in which merely literary subjects predominated. He then proceeded to treat of light—its sources and nature. On the latter he remarked that the Newtonian theory of luminous atoms was now in less favour among scientific inquirers than the Huyghenian doctrine of undulations; but that the subject was beset with difficulties, and in reality little or nothing was positively known respecting the intricate question as to the essence or nature of light. It was otherwise, however, with regard to its laws and properties, which had been determined by experiments with great exactitude. The lecturer then explained that light, in traversing the same medium, is transmitted in straight lines—that in its passage through media of different density it is bent out of its direct course, or refracted. The laws of refraction were then investigated, and the application of this principle shown in the construction of lenses and optical instruments. The velocity of light was next considered, when it was explained that by means of the eclipses of Jupiter's satellites, astronomers have proved that light travels the whole diameter of the earth's orbit in sixteen minutes, and consequently that it has a velocity of 200,000 miles in a second. The analysis of light by the prism was then elucidated, when it was shown that a ray of light could be resolved into the seven colours of the rainbow, which, however, according to the opinion of some philosophers, were again reducible to three primary ones. The lecturer then addressed himself to the explanation of the structure of the eye, and the functions of its several parts, in which the arrangements of nature for acquiring distinct vision are so beautifully exemplified. Much curious information was afforded as to the means employed for protecting the delicate organ from the chances of injury, and also the remedies which science had discovered for obviating the inconvenience of occasional defects. Its modifications, too, according to the respective wants, habits, and instincts of men, animals, birds, and insects, were pointed out, and illustrated in some striking instances. The polarization of light, and the phenomenon called the *mirage*, were next briefly referred to, and the discourse, which abounded in instructive matter, was concluded with some reflections on the marvellous beauty and perfection of light, and the softening and tranquillizing influence of eventide twilight, which, remarked the reverend gentleman, spoke in accents to the meditative mind more powerful than the eloquence of a Demosthenes. The lecture was listened to with great attention, and at its close was very warmly applauded by a numerous audience.

Leeds.—The Committees of the Yorkshire Union of Institutes, the Leeds Mechanics' Institution, and other friends of education, met in the Council-room, at the Court-house, on Wednesday, October 12th, to confer with Mr. Hugo Reid on a variety of suggestions published by that gentleman, and designed to approximate Mechanics' Institutions to People's Colleges. The chair was occupied by Mr. Wheelhouse, the President of the Mechanics' Institution. Mr. Reid, on being called upon, said, that on his plan he did not propose to deal exclusively with mechanics, but that he wished to embrace all classes, who, from their condition, terminated their school education at fifteen years of age. Mr. Reid then entered at length into the details, which were given in a recent Number of the Journal; explaining, that h thought it desirable that there should be a regular course of lectures, extending over about eight months, and continued for three years, and private classes, in which the teacher should meet a few pupils, and give them direct aid in the prosecution of their studies. With respect to the means of carrying this out, he was aware there might be many difficulties; the returns showed that about a tenth of the population were between fifteen and twenty-one years of age—this would give 10,000 in a population of 100,000. Now, it was quite possible that 4 per cent. of these, or 400 pupils, could be obtained, who, at a fee of 10*s*. each for a course, would pay 200*l*. a year; then if a fourth of these attended a private course at the same rate, it would add 25*l*. a year. This would be sufficient to remunerate one teacher; but as it was desirable that a lecturer should only treat of subjects with which he was fully conversant, it would be better to start properly with two; this would render it necessary to obtain about 150*l*. a year to aid in starting the scheme, which, however, he believed would ultimately prove self-supporting. The Chairman said that, as a practical man, he could not see his way to the realisation of the 400*l*. a year for two lecturers; and he feared that the range of subjects which must be assigned to each would be so numerous that they would be apt to be, as Yorkshire folks say, "Jacks of all trades, and masters of none." Mr. W. Beckett, M.P., said, it appeared to him that Mr. Reid's plan contemplated the mixing of classes, while he believed such institutions were originally only concerned with the industrious class. Whether this union could be effected with advantage, was a question to be determined by the experience of the meeting. The point to which he thought attention should be directed was, that here is at present no stimulus to improvement; and he elieved that many who attended such Institutions went way without having any opportunity of showing the nprovement they had made. If the funds would afford ;, more paid teachers were certainly desirable. At the ame time, Mechanics' Institutions had worked well, and rrived at a point which could scarcely have been exected; and he thought we should be cautious in the itroduction of anything that would destroy the popuarity which had hitherto marked their progress. He ncluded by moving the following resolution: "That is meeting, being convinced of the desirableness of nproving and extending the studies pursued in Mehanics' Institutions, and especially of rendering them ore systematic and efficient, recommend that, wherever racticable, the attention of the committees of such stitutions should be directed to this object." Mr. aines, in seconding the resolution, thought we could arcely build on so large a class as Mr. Reid somewhat nguinely anticipated. He had no reliance on mere umbers, and he had also great fears, on the ground that many young men changed their places of employment the few years after they left school. A reference aving been made to Government aid, Mr. Baines said e could not be a party to any system which would ake literature and science dependant on a Governent. The resolution was carried unanimously. Mr. ames Hole quite agreed with Mr. Beckett and Mr. aines, thinking that the present advantages of Mechaics' Institutions should not be altered, but added to. o far as they had failed, it was for want of systematic struction. The experiment had been tried successfully Glasgow, Edinburgh, and Huddersfield; and he did ot think it difficult to get even working men to pay 0s. or 1*l.* per annum for good instruction. He conuded by moving the following resolution, which was bsequently carried unanimously: "That the cordial anks of this meeting be given to Mr. Hugo Reid for is attendance on this occasion, and for the very full position of his views on the important subject of tending and systematising education in Mechanics' d similar Institutions with which he has favoured this nference." Mr. Wilson considered all the Institutions the town for education deficient. If a first-rate eduational Institution were established in the town for the ns of the better classes, the services of the teachers uld be secured to give the instruction desired to the uth of the middle and working classes. Mr. Traice ncurred in Mr. Wilson's suggestions.

On Monday and Wednesday evenings, Mr. Reid ctured on "The Reception of Great Discoveries," and "The Popular Study of Astronomy." The first lecture eated of the discouragement and even persecution to hich many of the greatest benefactors of mankind had een exposed in consequence of their having given great iscoveries to the world. Narrow motives of self-interest d often been the occasion of this; but it was still ore frequently the result of miserably imperfect eduation, of a reluctance to forego cherished opinions, of a islike to have the settled order of ideas subverted, and ove all, of a repugnance to own we are in the wrong. behoved us to be watchful of ourselves in forming inions, and especially in refusing to accept new truths, d where there was improbability we should suspend r judgment, and never decide in the negative upon perfect or *à priori* reasoning.—On Wednesday, Mr. eid lectured on the "Popular Study of Astronomy," vocating the acquisition of broad views of the mechaism of the heavens by direct observation with the naked e, and by constant association of interesting phenomena with the changes of bodies in space, such as the limit of the area on the earth, in which the sun can ever be directly over head, the terminal line of illumination; and the mode in which it defined day and night in the several zones of latitude, and the comparative changes of relative position which could be observed by watching the moon and planets from any fixed point. By these means he believed it possible for any person to obtain an excellent idea of those vast phenomena, upon the exact observance of which so many important discoveries in science, with such useful applications, especially to navigation, were based.

SHIFFNAL.—On Friday evening, the 14th instant, Mr. E. Wheeler, delivered a Lecture to the members and friends of the Mechanics' Institution, on "The Curiosities of Insect Life."

TAMWORTH.—At the annual meeting of the Midland Association of Mechanics' and similar Institutions, which is to be held at Tamworth on Tuesday, the 25th inst., the following will be the order of the proceedings: The delegates from the associated Institutions of the seven midland counties will meet in the Town Hall at half-past twelve o'clock. The chair having been taken by the Earl of Yarborough, the President for the year, and the report read by the Hon. Secretary, the officers for the ensuing year will be appointed, when the President elect, Sir Robert Peel, Bart., will be called to the chair by the retiring President. Questions of interest to Mechanics' Institutions will then be discussed, and reports of local improvements, &c., brought before the meeting. A dinner will be provided for the delegates, and in the evening there will be a conversazione, in which the following noblemen and gentlemen are expected to take part: Sir Robert Peel, Bart., President; the Earl of Yarborough; Lord Hatherton; Sir Charles Fox; Charles Adderly, Esq., M.P.; M. T. Bass, Esq., M.P.; W. Scholefield, Esq., M.P.; Dr. Lyon Playfair, C.B.; Wilson Overend, Esq., Deputy Lieutenant of the West Riding; the Mayors of Tamworth, Birmingham, Derby, &c.

WHITCHURCH.—The Mechanics' Institute held its opening meeting for the season, on Tuesday evening last, at the National School (the use of which was generously granted by the Committee), when a Concert was kindly given by the Whitchurch Choral Society, assisted by some of the members of the Ellesmere Choral Society, in aid of the funds of the Institute. The Concert was conducted by Mr. C. F. Bird, the leader of the Choral Society.

## TO CORRESPONDENTS.

*Errata.*—At page 479, first column, line 21 from top, for 5,350,000 *tons*, read 5,350,000 *quintals* (= 100 lbs.), *which would give* 238,839 *tons;* and line 24 from top, for *alone export* 30,000 *tons*, read, *export a large portion of the* 30,000 *tons annually exported.*

Notices of the Leamington, Southampton, and Windsor Institutions, are in type, and will appear next week.

## MISCELLANEA.

**WOOL FROM THE VEGETABLE KINGDOM.** — The name of vegetable wool has been applied to a fibrous material which the ingenuity of Mr. Pannewitz has succeeded in extracting from the leaves of the fir. A manufactory of this material has for some time past existed near Breslau, in Silesia, in a district termed the "Prairie of Humboldt." The species of pine there operated upon, is the *pinus sylvestris*, or wild pine; it would seem that every member of the pine tribe might be turned to similar account. The leaves of these trees, if examined, will be found to be made up of a fibrous material, held together by a resinous substance. The latter may be dissolved out by means of alkalies, leaving the woolly matter behind. Coverlets, blankets, and other articles made of vegetable wool, have long been employed in Austria, Vienna especially, in some charitable institutions. The materials are warm, durable, and agreeable to the eye; moreover, they enjoy the excellent quality of preserving a certain balsamic and rather agreeable smell, which, nevertheless, is so inimical to insects, that they never harbour in it. In the Silesian manufactory, the resinous matter holding the woody fibres together is also turned to account, medicinal baths being made with it as a basis, and which are found to be useful in many chronic diseases.—*Polytechnic Journal.*

A NEW KIND OF COTTON.—The editor of the *Tribune* has seen a specimen of a new and very beautiful sort of cotton, brought from among the Pine Indians of New Mexico by an officer of the Mexican Boundary Commission. Its peculiarity consists of a fine, silky staple, superior in length and strength to all kinds previously known. The seed has been introduced into Texas, and the plant will soon be grown there extensively. It has also the great advantage of not degenerating, and not requiring a renewal of the seed. The plant, if all these peculiarities are proved permanently to belong to it, must effect a revolution in cotton raising. *American Paper.*

HARRISON'S PATENT WATER AND SPIRIT METER.—In this instrument, the liquid in passing through the meter, acts in two opposite directions against two flexible diaphragms placed between chambers, into which it is alternately admitted; thus displacing at every movement from the one chamber, a quantity of liquid equal to that admitted into the other. This action gives motion to spindles, which is ultimately communicated to the registering hands, and thus the dial of the meter shows accurately, at a glance, the quantity drawn off in gallons, quarts, pints, &c. The instrument is said to be simple in construction, certain in action under any pressure, and requiring no regulator to govern its movements, the apparatus may be connected at once to the main or to the cask, and the quantity sold or drawn off at any part of the premises duly registered.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette*, 14*th October*, 1853.

*Dated* 11*th July*, 1853.

1651. F. L. Bauwens, Pimlico—Candles.

*Dated* 2*nd August.*

1807. M. T. Raymond, 25, Clement's-lane, Lombard-street—Retarding and stopping railway-trains.

*Dated* 28*th September.*

2219. M. Poole, Avenue-road, Regent's-park—Manufacture of pulp for paper-makers. (A communication.)

2221. J. Barsham, Kingston-upon-Thames—Bricks, tiles, and blocks.

2223. W. Hickson, Carlisle—Machinery for manufacturing and packing bread.

2225. W. E. Newton, 66, Chancery-lane—Machinery for cutting metal, &c. (A communication.)

2227. J. A. Labat, jun., Bourdeaux, and 16, Castle-street, Holborn—Stoppering vessels and bottles.

*Dated* 29*th September.*

2229. J. Phillips, Birmingham—Improvements in shaping vessels.

2231. F. J. Raux, Montmartre—Railway-brakes.

2232. J. Griffiths, Wolverhampton—Steam-engines.

2233. T. W. Kennard, Duke-street, Adelphi — Constructing piers and foundations under water.

2234. H. Berdan, New York—Machine for preserving mercury in process of amalgamation, and for washing and amalgamating gold and other ores.

*Dated* 30*th September.*

2235. P. A. le Comte de Fontainemoreau, 4, South-street, Finsbury — Treating certain plants for production of a fibrous substance, called vegetable silk. (A communication.)

2236. J. Willis, Wallingford, Bucks—Gig harness.

2237. J. H. Johnson, 47, Lincoln's-inn Fields—Throwing ropes for preserving life. (A communication.)

2239. R. Brisco, Low Mill House, St. Bees, Cumberland, and P. S. Horsman, Beckermet—Machinery for heckling flax, hemp, &c.

### WEEKLY LIST OF PATENTS SEALED.

*Sealed* 12*th October*, 1853.

871. Henry Blake, of Brighton—Improvements in railway wheels.

*Sealed* 13*th October.*

901. John Chadwick, of Manchester, and Thomas Dickins, of Spring Vale Works, near Middleton, Lancashire—Improvements in the production of raw and thrown silk.

925. Joseph Cooke and William Cooke, both of Birmingham—Invention of machinery for cutting or shaping corks and bungs.

926. George Albemarle Cator, of Selby, Yorkshire—Improvements in machinery for preparing flax, hemp, and other vegetable fibrous substances, for scutching or other manufacturing processes.

933. William Mc Naughten, of Aberdeen—Improvements in printing yarns or worsteds for weaving carpets; also in printing carpets, woollen, silk, cotton, and other textile fabrics or fibrous substances.

939. Thomas Newey, of Garbett-street, Birmingham — Improvements in fastenings for articles of dress.

959. Thomas Dunn, of Windsor-bridge Iron-works, Pendleton, near Manchester—Improvements in and applicable to boilers or apparatus for generating steam, and in apparatus connected therewith.

975. Jerome André Drieu, of Bowden, Cheshire—Improvements in cutting the pile of velvet, velveteens, and other piled fabrics.

1005. William Johnson, of Farnworth, near Bolton-le-Moors—Improvements in machinery for preparing and spinning cotton and other fibrous substances.

1045. Colin Mather, of Salford—Improvements in apparatus used in bleaching.

1089. Thomas Masters, of Oxford-street — Improvements in apparatus for freezing, cooling, and churning.

1258. William Chisholm, of Holloway—Improvements in the purification of coal-gas, for the purpose of illuminating and heating, and obtaining, by the ingredients used therefore, manures, salts of ammonia, and sulphur.

1709. Thomas Wood and George Wade, both of Sowerbybridge, Yorkshire — Improvements in machinery or apparatus for opening, cleaning, carding, or otherwise preparing cotton, or other fibrous materials, to be spun.

1750. Charles Frederick Spieker, of New York—Improvements in generating and fixing ammonia.

1882. Edward Lavender and Robert Lavender, both of Deptford—Invention of an apparatus for preparing the materials employed in the manufacture of certain composition fire-lighters.

1928. Joseph Hart Mortimer, of Chester-place, Old Kent-road—Improvements in lamps.

1935. Peter Fairbairn, of Leeds—Improvements in heckling-machines.

*Sealed* 14*th October.*

899. Constant Jouffroy Daméry, of Paris—Improvements in the manufacture of paste and enamel buttons.

914. François Marie Antoine Serruys, of Bruxelles—Improvements in tanning. (A communication.)

916. George Titterton, of Margaret-street, Cavendish-square—Improvements in brushes.

918. William Allen, of Westbourne-street, Pimlico, and William Murrell, of Grosvenor-road, Pimlico—Improvements in the mode or modes of cleansing bottles or other similar articles.

920. William Edward Newton, of Chancery-lane—Improvements in treating refuse silk waste, and in converting it into a valuable product. (A communication.)

949. Andrew Blair, of Maryhill, Lanark—Improvements in propelling vessels.

### WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Oct. 17 | 3520 | Rolled Bar of Rod-iron, for making Nails or Spikes. | William James.................. | Crosby-hall Chambers, Bishopsgate-street. |

# SOCIETY OF ARTS.

**FRIDAY, OCTOBER 28th, 1853.**

## NOTICE TO INSTITUTIONS.

A number of copies of a work on Drawing having been placed at the disposal of the Council, as presentation copies for the Drawing Masters of the Institutions in Union, it is requested that any of the Masters who may wish to have a copy will apply to the Secretary.

## STATISTICS.

The Circular and List of Queries proposed by the Society of Arts, 25th July last, with a view to obtaining correct information as to the actual condition of the Literary and Scientific Institutions and Mechanics' Institutes of the United Kingdom, have been duly responded to by about one-third of the whole number. Many of those which have been received have evidently been most carefully filled in, and considerable time must have been occupied in procuring the requisite information for the purpose. But unless a large proportion of the remaining two-thirds are returned, it will not be possible to publish a summary of the replies in that form which was at first intended, so as to show not only the actual extent and importance of these Institutions, but also their predominance in particular districts and counties, so as to enable some deductions to be drawn as to their usefulness in promoting and advancing education.

It is earnestly desired that those Institutions which have not yet made any return to the Queries in question, will do so with as little delay as possible, and not later than the 1st of November; and that the secretaries and officers of Institutions will also urge upon others in their several localities, or to whom they may happen to be known, the importance and necessity of making the returns by the time stated.

## EXHIBITION OF INVENTIONS.

It may be said that to attempt to find a new form of words annually by which to set before the members of the Society of Arts the importance and utility of holding Exhibitions, is a useless expenditure of time, especially at a period when Exhibitions themselves have become, as familar as "household words," and their utility as a means of education almost universally admitted. The truth of such a statement, in reference to manufactured articles and the fine arts, cannot be denied; but, notwithstanding the efforts which have been made, from time to time, to prove to inventors that their interests would be materially advanced, and their claims upon the public for special support greatly increased, by the annual exhibition of the results of their individual labours—and the arguments so continually urged against the propriety of the Government granting monopolies for the sole manufacture of articles resulting from their ingenuity, would be much weakened—still it is with great difficulty, and at considerable cost, that collections of patented articles, even on a limited scale, can be brought together; and, consequently, an object so much to be desired is rendered difficult of accomplishment.

The annual exhibition of a complete series of models, and drawings of patented articles, would doubtless do much to show in what direction the public require the greatest amount of ingenuity to be exercised at a given time, and the various means by which such requirements are endeavoured to be met. So strongly has the necessity for the existence of such a collection been urged by some, that when discussing the Patent Laws, and modes of amending them, previous to the present laws being framed, it was considered that a clause should be introduced into the Act by which it should be rendered imperative upon every inventor, and one of the conditions upon which the patent was granted, that he should deposit with the Government a model of the improved machine, or specimen of the manufacture, for which he claimed a right of special protection. The value of such a collection of the efforts of inventive minds would form in a few years one of the most valuable historical records which a nation could possess. It would afford a ready means of ascertaining what had previously been done in any given direction, and prevent much of the expenditure of capital by men of humble circumstances, as well as a loss of time, so detrimental to the best interests of their families.

It may be urged that the force of such argument is now greatly diminished, seeing that the law renders it imperative that a complete specification and series of drawings shall be deposited at the Patent-office, which series and specification the Government itself undertakes to publish at length. Such, we are glad to know, is the case; but what efforts, we would ask, will be made to circulate, through the length and breadth of the land, the invention of the time, and by what proportion of the public will a drawing and specification be read, examined, and understood?

Until provision is made for the spread of such general knowledge, the Council of the Society of Arts cannot but feel that they are endeavouring to supply a great public want, by collecting annually, for exhibition, a series of models illustrative of the inventions of the times; and desire strongly to urge upon members and patentees the importance of a cordial co-operation in so important a work. They propose to open the Fifth Annual Exhibition of Patented Inventions early in November, in accordance with the notice given in the last number of the Journal, and have extended the time for receiving models and specimens to the 31st instant.

## LONG-HAIRED ANGORA GOAT.

The Council has for some time past had under consideration a communication from the Swellendam Agricultural Society, relative to the introduction of the long-haired Angora goat into the colony of the Cape of Good Hope, with the view to the export of its wool to Europe; which was transmitted, through the Colonial Office, to

His Royal Highness Prince Albert, K. G., the President, by whom the Council has been requested to obtain the information desired.

It would appear from the statements of Messrs. H. Vos and W. M. Hipley, sen., that, in the year 1838, Colonel Henderson (with whom Mr. Hipley, sen., formed a partnership) imported a small flock of long-haired Angora goats into the colony. This flock consisted of forty originally; of which only *one* she-goat (which never bred) and twelve rams arrived at the Cape; and of these only *one* he-goat (born on the road) was fit for propagation, the rest having been purposely emasculated in some way or other. They were sent overland from Angora to Smyrna, thence to Constantinople, Alexandria, Suez, Arabia, Persia, Bombay, and the Cape. These goats are said, on their arrival, to have stood the enterprising importer in an exorbitant sum. The reason for obtaining them by this circuitous route, as well as the enormous cost, have not been ascertained. From this goat, and its progeny, half-breeds and crosses of various descriptions have been propagated, and the health and weight of carcass of the cross breed has made them to be universally sought after by proprietors of goat flocks; but owing to the want of a sufficient number of thorough-bred goats, the cross-breed is fast disappearing. The improvement not having been carried to a sufficient extent, the value of the fleece, whether it be called mohair, tiftik, or goat's-hair, has never been ascertained. The information required by the Swellendam Agricultural Society is, whether a breed of goats exists in Angora, bearing only one description of hairy covering of a silken fineness, which can be annually clipped?—whether such fleece is purchased in Europe, as it comes from the goat's back, and without requiring the expensive picking process which Cashmere or Thibet, or other shawl wool containing an under down, must undergo?—also, what the value of such fleeces would be per pound?—and whether any large quantity of it would be required by the European manufacturers?—and whether this description of goat could be obtained *viâ* Constantinople, and sent to the Cape, at a reasonable expense?

Members of the Society and others are requested to aid the Council in procuring the desired information. And if satisfactory answers can be given to the above queries, there is little doubt but that efforts will be made by which, in a few years, a large quantity of goats' wool would be added to the exports of that colony, as there are in that district many proprietors possessing from one to two thousand goats, which are bred merely for the sake of the skin and flesh.

The subject of the white-haired Angora goat was brought under the notice of the Royal Asiatic Society, in January, 1840, when a paper was read by Lieut. Arthur Conolly, of the Bengal Cavalry, "On the White-haired Angora Goat, and on another Species of Goat, found in the same Province, resembling the Thibet Shawl Goat."* In this paper it is stated that

"A goat resembling the shawl goat of Thibet exists throughout the country, to which the long famed, beautiful, silvery white hair goat of Angora is peculiar." . . . "The goat of the latter race is peculiar to the province of Angora, and certain adjoining districts, is invariably white, and its coat is of one sort, namely, a silky hair, which hangs in long curly locks." . . . "The country within which it is found was thus described to us: 'Take Angora as a centre, then the Kizzil Ermak (or Haly's) Changere, and from eight to ten hours' march (say thirty miles) beyond; Beybazar and the same distance beyond, to near Nalahas; Sevree, Hissar, Yoorrook, Tosiah, Costambool, Geredeh, and Cherkesh, from the whole of which tract the common bristly goat is excluded." . . . . "The fleece of the white Angora goat is called *tiftik*, the Turkish for goat's hair, in distinction to *yun*, or *yapak*, sheep's wool. After the goats have completed their first year, they are clipped annually, in April or May, and yield progressively, until they attain full growth, from 150 drachms to 1½ oke of tiftik (from 1 lb. to 4 lbs. English.)" . . . "An oke of good common *tiftik*, of this year's shearing, is now selling in the Angora Bazaar for nine piastres, or about 1*s.* 8½*d.*; and the finest picked wool of the same growth is fetching fourteen piastres per oke." . . . . . "The hair of the tiftik goat is exported from its native districts raw, in yarn, and in the delicate stuffs for which Angora has long been famous. The last are now chiefly consumed in Turkey; a little yarn and a large quantity of the raw material goes to Europe." . . . The weaver (at Angora) "contracts to work a piece of thirty *piks*, or rather more than twenty-one yards, for a sum which varies, according to the texture required, from 15 up to 100 piastres; and by working steadily, he may finish a piece of this regular measure in six days." . . . "According to the information that was kindly procured for me by an English merchant at Constantinople, when some bales of white Angora goats' hair were shipped thence to England, in 1820, the article was so little appreciated, that it brought only 10*d.* per pound. Since that period, the English demand for the raw hair has been annually increasing, and the ordinary price for many years has been 18*d.* per pound, though, from unusual causes, it has fluctuated from 22*d.* to 14*d.*" . . . "The following list of exports from Constantinople, for the last three years, will show how one article has superseded the other, and what is the present state of the trade:

| | | Mohair Yarn. | Tiftik. |
|---|---|---|---|
| 1836 | bales | 538 | 3841 |
| 1837 | ditto | 8 | 2261 |
| 1838 | ditto | 21 | 5528 |

Lieut. Conolly then speaks of another species of goat, which, however, is *not* the one that the Swellendam Agricultural Society recommends to be introduced. He says:

"I will now speak of the second race. This goat has an unchanging outer covering of long bristle, between the roots of which comes in winter an under coat of downy wool, that is naturally thrown off in spring. A remarkably fine breed of this species exists throughout the area to which the Angora white-hair goat is limited; but similar breeds prevail all over the highlands of Turkish and Persian Armenia, and Kurdistan, in the neighbourhood of Kerman, and probably in other elevated parts of Persia." And again:—"Goats of this breed in Angora are occasionally mixed with the white-hair goat first described, either by the shepherds' inattention, or when a remarkable flock-leader is desired."

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* Vide "Journal of the Royal Asiatic Society of Great Britain and Ireland," Vol. VI. (for 1841), pp. 159, *et seq.*

Mr. Thomas Southey, in his work on Colonial Sheep and Wools, &c. &c. (London, 1852), says:

"Within the last two or three years, a new texture, made of goat's wool, has, however, been introduced, both into France and this country, which calls for particular attention. This texture consists of stripes and checks expressly manufactured for ladies' dresses, and having a soft feel and silky appearance. The wool of which this article is made is chiefly that of the Angora goat, the properties and peculiarities of which were so faithfully delineated in the paper written by Captain Conolly." . . . "The wool of the Angora goat (*Capra Angorensis*) reaches us through the Mediterranean, and is chiefly shipped at Smyrna and Constantinople. In colour it is the whitest known in trade, and now more generally used in the manufacture of fine goods than any other. There are, however, other parts of Asiatic Turkey from which limited supplies are received, but in quality not so good as that produced in Angora." . . . "After the manufacture of shawls with goat's wool declined in France, this raw material remained neglected for a long while. About two or three years ago, however, the French made another attempt, and brought out a texture for ladies' dresses in stripes and checks, which they call '*poil de chevre.*' The warp is a fine spun silk, coloured, and the weft Angora, or Syrian white goat's wool, which was thus thrown on the surface. This article has a soft feel, and looks pretty, but in wearing is apt to cut. The price of a dress of French manufacture has been from £3 to £2 10*s.*; but by adopting a cotton warp, the same article is now made in England, and sold at 15*s.*; and it is found that the cotton warp, as a mixture, suits the goat's wool best. The principal manufactures of 'Poil de Chevre' in France are at Paris, Cronyen, Thelle (Oise), Ecrus (Oise), Montataire (Oise), and Ledan. In England the wool is chiefly spun at Bradford, and partly manufactured there, at Norwich, and also in Scotland; part of the yarn is exported, principally to France. The French are now attempting some plain goods, all goats' wool, dyed lavender, violet, &c., but it is not thought that they will answer."

In a work published by the same author, in 1851, we are told that "in 1848 the quantity of mohair, or goat's wool imported into the United Kingdom was 896,865 lbs.; in 1849 the quantity imported rose to 2,536,039 lbs. To show the gradual rise in our importations of this article, the following comparative returns are annexed:

| | 1846. | 1847. | 1848. | 1849. | 1850. |
|---|---|---|---|---|---|
| Goats' wool—bales . | 5,231 | 7,023 | 5,468 | 13,254 | 12,884 |

"Angora goat's wool, for several years past, has been used by our manufacturers for plush, as well as for coach and other decorative laces; and also extensively for buttons, button-holes, and braidings of gentlemen's coats. It is equally made up into a light and fashionable cloth, suited for paletots and over-coats, having besides the advantage of repelling wet. In France this article is now applied to the manufacture of a new kind of lace, which in a great measure supersedes the costly fabrics of Valenciennes and Chantilly. The Angora goat's wool lace is more brilliant than that made from silk, and costing only half the price, it has come into very general wear among the middle classes. The same material is also manufactured into shawls, which sell from 4*l.* to 16*l.* each. When Angora goat's wool was first introduced, it realized only 1*s.* 3*d.* or 1*s.* 4*d.* per lb.; but recently, on arrival, it has been sold for 1*s.* 9*d.* or 1*s.* 10*d.*"

In a work by M. Polonceau, published in 1824,[*] it is stated that, "It was not long before I was convinced that among the different varieties of the goat known to me, that of Angora was the only one which could fulfil my intentions, that of crossing with the Cashmere, for the purpose of increasing the quantity and value of the down (duvet); because the goats of this (the Angora) breed, are the only kind of which the fine and silky fleece (toison) partakes, of many of the qualities of the down (duvet) of the Cashmere; although it does not possess equal fineness or softness, at the same time surpassing it in length and elasticity." Speaking of the Cashmere goat, M. Polonceau says, "They bear a coarse hair (poil), called Bal in Cashmere, which covers the *tiftik*, or woolly down (duvet laineux), employed in the fabrication of shawls."

## NEW GAS REGULATOR.

An American invention has recently been patented in England, and introduced into Manchester, which is calculated to accomplish this object to such an extent as must ensure for it general attention. Many experiments have been made in order to determine what is the best burning pressure, and it is found to be not more than what is equal to four-tenths of an inch of a column of water. Now if this be the *best* pressure, then any degree above or below it must be inconsistent with true economy. It happens that the pressure of gas coming through the pipes in the streets is very considerably above four-tenths of an inch; perhaps never less than twice, and often more than four times in excess of it. The reason why the pressure at the gas-works cannot be made to coincide with that of the best burning pressure, is because a certain force must be exerted upon the gas, in order to propel it through the pipes to the various parts of the city and the surrounding townships. A great waste of gas is therefore constantly taking place, in consequence of the street pressure having to be received as the burning pressure. The invention we refer to is intended to remedy this evil, and having given the instrument a fair trial in our printing-office, we are in a position to speak definitely as to its efficiency. The patent regulator has been tried for a regular number of consecutive hours, and the measurement by the meter noted. It has then been disused for an equal number of hours, when the same number of lights were burning, and the result recorded. To prevent error, this has been repeated several times, since the 22nd of August to the present date. The result is as follows: when the street pressure was lower (as it was when the regulator was first attached, less gas being then burned in the town, owing to the days being longer) the saving effected by the regulator was 20 per cent.; with the present street pressure, the saving is 25 per cent., and we have no doubt but this will be the average saving the year round. The diminished cost in gas, however, is not the only advantage obtained. Every person will have noticed that in a gas-light, a large portion of the flame, immediately above the burner, is of a blue colour. This results mainly from over-pressure, and is so much diminished by the intervention of the regulator, that the light becomes much whiter, and more nearly resembling daylight. Another valuable property, one of a sanitary description, also results from the use of this contrivance. Under the street pressure, a portion of the gas escapes unconsumed, which causes an unpleasant smell, and vitiates the air. The regulated pressure admits of complete combustion, and thus the contamination is avoided. The instrument itself is of small dimensions. The upper portion of it consists of a hollow circular cup, about five inches diameter; the concave side is downward, and is immersed in quicksilver. The gas enters this concavity from beneath, after passing through the meter at the street pressure; it then takes whatever reduced pressure the consumer prefers, the whole being adjusted by simply placing the required weight at the top of the instrument. This done, no further attention seems to be required, for the simplicity of its arrangement, and the medium (mercury) in which it operates, renders derangement next to impossible; and no amount of fluctuation in the gas mains, or increased or suddenly-diminished number of lights, produces any effect upon it. The invention appears to have come into extensive use in America, and is highly spoken of by several of the newspapers, in whose offices it has been fitted up. The *New York Daily Times* says: "From several trials we have made with Dr. Kidder's regulator, we are convinced that it saves fully 25 per cent. of the gas consumed, and it gives also a better, softer, and more equable light." Speaking, however, solely from our own trial of its merits, we can have no hesitation in recommending its general adoption.—*Manchester Examiner and Times.*

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[*] Vide "Notice sur les Chevres Asiatiques à duvet de Cachemire, et sur un essai tenté pour augmenter leur duvet et lui donner des qualités nouvelles," par M. Polonceau. 1824.

## CULTIVATION OF TEA IN THE PUNJAB.

An article, "On the Physical Aspect of the Punjab, its Agriculture and Botany," by Dr. Jameson, Superintendent of the Botanic Garden, Saharunpore, appears in the current number of the *Journal of the Horticultural Society of London*, having been communicated to that body by the Honourable Court of Directors of the East India Company. In this article Dr. Jameson makes the following remarks on Tea Plantations and the Cultivation of Tea:

"The town of Kangra, situated in the middle and southern side of the valley, is elevated about 3000 feet, on the same altitude as Nugrotah, where the tea nursery is formed; Bobarnah is 4000. Here the tea plant is thriving equally luxuriantly as at the former-mentioned place. Holta, which we have selected as a site for a tea plantation, is a fine open and gently inclined (with a southern exposure) waste plain, of about four to five miles in length; and in altitude from 4000 to 5000 feet, and commanded by the Cura and the Nigul, two considerable-sized rivers. The soil consists of a thin stratum of black mould, with a subsoil of a stiff but friable reddish clay, resting on boulders. Throughout this fine valley there are many tracts of waste land at altitudes varying from 3000 to 5000 feet, equally well adapted for tea cultivation. In the adjoining province of Kooloo, a rugged and bold mountainous country, there are also many places well fitted for the tea plant. But the Kangra valley, from the facilities of exportation, and the advantages of water communication to Bombay, is second to no place, the road to the plains being adapted for camels and bullocks, most of the grain there grown being thus exported. It has been asserted that tea could not be cultivated on a sufficiently extensive scale in the north-western provinces and the Kohistan of the Punjab to supply the home market, owing to the want of land. But this is a great mistake. Land there is in abundance in the British hill provinces, and much of it lying waste, and possibly the time is not far distant when this cultivation may be carried into the valley of Cashmeer and the lower valleys of Hazara, which will be found well adapted for the purpose. In Kumaon and Gurwahl vast quantities of waste land, admirably adapted to tea cultivation, exist, and all that is wanted is capital to clear the jungles. Major Madden has stated, in his account of Kumaon, that the Zemindars give up their lands for the culture of tea with difficulty, and that but little waste land exists. The latter assertion is erroneous, but the former, regarding the people of Bheemtal, is true. Not so with others in Gurwahl, and this I give not only on my own authority, but on that of a person* high in rank, who, on a late tour through Kumaon and Gurwahl, found the Zemindars most anxious and willing to undertake the cultivation of the tea plant, and land to any amount available, provided that the officers in charge of the districts "went the proper way about it." Mr. G. Barnes, the talented deputy-commissioner of the Kohistan, states that 25 per cent. of his districts might most advantageously be cultivated with tea. The commissioner of Kumaon, too, Mr. Balten, states that land for tea cultivation is abundant. Thus regarding the district of Katere, he says, "Biejnath, situated on the frontier of Kumaon with Gurwahl, and in the neighbourhood of Budbak Fort, was often, in all probability, the scene of border conflicts and military exactions; and the desertion of villages once having commenced, and no means of restoring the population being at hand, the deterioration of climate originating in the spread of rank vegetation and the neglect of drainage, &c., may be supposed to have gone on from worse to worse, till finally the heat and moisture were left to perform all their natural ill offices, unchecked by the industry and efforts of man." Viewing, however, the present slight improvement in a hopeful light, *and remembering the less favourable situations in which tea nurseries are thriving*, I am of opinion that the district of Kuttoor (Biegnath) would be found the one most deserving of selection for the future spread of Kumaon tea cultivation. Irrigable unoccupied lands, at between 3000 and 5000 feet above the level of the sea, abound on the lower slopes of the hills, while much of the good land in actual possession is occupied by migratory tenants at will, unattached to the soil, in whose place the Pudhans of villages could have no reasonable objection to see profit paying wealthy planting gardeners. The very fact that at the present settlement (which took place before any discussion arose concerning the extension of the tea experiment) seventeen pottahs of villages were, in Kuttoor, obliged to be made over to non-proprietary moostagirs, or farmers, the richer or less desponding neighbours of the resigning pudhans, shows that available ground was at our disposal. But there, and in Pergunnahs, Gungolie, Sher, and Seera, the sole expense of securing the land would have been (and even now in many places would still be) the wiping off the Jumna from the revenue books, probably some paltry sum of less than twenty rupees per annum. Again, at p. 342 of his excellent Settlement-report of Gurwahl, he states, "Those who look to the spread of the cultivated tea-plant over these mountains as likely to change their financial position to the state altogether, and convert them into treasuries of surplus revenue, may not be far wrong. If this extension of the China herb be at first carried on (in the way I have pointed out in the preceding report) without disturbing present possessions, and thus exciting more than the ordinary and normal native disgust at the novelty, the present generation may yet behold the now jealous occupants of rice and wheat-fields, humble applicants for tea-seeds." Such, too, is the opinion of the District-officer, Captain Ramsay. This season Mr. Batten informs me that in several districts, though the crops have been immense, yet the Zemindars find difficulty in paying their revenue, as the market is so glutted with the grain it will not pay the carriage. If proofs were wanting, in order to show the advantages of tea cultivation throughout the Kohistan and British hill provinces, stronger could not be brought forward than the facts here stated.

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* Mr. Robinson, of the Revenue Board, N. W. Provinces.

"Here we have the agricultural population with grain lying on their hands as a perfect drug, and not worth carriage to the available markets, and at the same time complaining that owing to the abundant harvest prevailing throughout the country they cannot pay the revenue. Were the system prevailing in China (according to the statements of Mr. Fortune) introduced into the British Himalayas, viz., a certain quantity of tea cultivation in each village community, we could no longer hear the above complaints, as for tea-leaves there could always be a ready and remunerative market; moreover, the high rate at which they could be purchased at the manufactories, viz., eight rupees per maund, could admit of their transport by the Zemindars from a great distance, even sixty or seventy miles, with profit. But one of the greatest obstacles to the cultivation of the tea-plant by Zemindars is the dread that land so occupied will be charged at a higher rate than other produce, or resumed by government. To remove these prejudices steps are now being taken by the commissioner. Let these once be removed, and the agricultural population[*] convinced of the utility of tea cultivation, and we shall no longer hear that there are no available lands."

### BERDAN'S GOLD MACHINE.

On Thursday week several of the proprietors of the Cwmheisian Mines, in Merionethshire, North Wales, made some experiments at the Windsor Iron-works, in the City-road, where one of these machines with two basins has been erected, for the purpose of testing its merits upon ores from those mines. The Cwmheisian Mines have been long known to possess gold ore, in addition to lead and other minerals, for which they have been ostensibly worked. A large fortune was, it is said, spent by the late proprietor, in endeavouring to obtain the riches which existed, but the great cost of extracting them by the machinery hitherto available, rendered the attempt unsuccessful. The result of the experiment was stated to be as follows: that 362 lbs. of ore taken from various parts of the East Mine, yielded by amalgamation 154 grains of pure gold, or after the rate of 2 ozs. 12 grains to the ton of ore; that 98 lbs. of the ore from the West Mine, yielded, by amalgamation, 66 grains of fine gold, or after the rate of 3 ozs. 16 dwts. to the ton of ore; that the gold, on assay, was found perfectly pure; and that the residuum, or "tailings," on careful assay, contained no trace of gold.

On Wednesday last a number of scientific gentlemen attended at the same place to witness similar experiments. In one of the basins was placed 444 lbs. of Poltimore ore, and in the other 320 lbs. of ore from mines in Merionethshire. From the Poltimore ore 5 dwts. 11 grains of pure gold, was stated to have been produced, and from the Welsh ore, 5¾ dwts.

The machine itself seems capable of some improvements in the details, and it is not difficult to imagine that the present method of giving motion to the basins by means of cog-gearing will soon be superseded. One material point has been omitted in the statements which have been made as to the results obtained by the machine, and that is, the probable expense of working—for even gold, like other things, may be made unprofitable, if the cost of obtaining it is greater than its value in the market.

### PUBLIC HEALTH.

#### LEAD, COPPER, OR ZINC PIPES.

The Minister of Commerce, Agriculture, and Public Works in France, has just issued a circular to all Préfects, calling upon them to put a stop to the use of lead, copper, or zinc pipes in breweries. The Minister in his circular states that "Experience proves that beer, by simple contact with lead, takes up an appreciable quantity of the metal, and thus acquires poisonous properties. Leaden pipes are not only used in breweries; but a custom has arisen in taverns, and in houses where wine is sold, of using a small pump, which communicates with the barrels in the cellar by means of a leaden pipe. The use of the pipe in this instance is peculiarly objectionable, inasmuch as the action of the pump is at intervals only. A whole family was poisoned by using for some time a pump of this kind for drawing up their ordinary consumption of wine. The Préfect of the North, who had already taken the initiative in adopting measures necessary for putting a stop to the methods used in his department for the refining of beer, has, following the advice of the Council of Public Health, just proscribed the use of lead, copper, or zinc pipes, for the drawing or transmission of this liquid.

## COLONIAL CORRESPONDENCE.

### GARANCINE AND JUICE OF THE MUDDAR.

The Society has received a communication from the Secretary to the Agricultural and Horticultural Society of India, enclosing extracts of letters from Mr. T. T. Henley, and Capt. G. E. Hollings (Deputy Commissioner in the Punjâb), relative to "Garancine," manufactured from the "munjeet," or Indian madder (*Rubia Munjista*, Roxb.), and to the juice of the "ak," or "muddar" plant (*Calotropis Hamiltonii*), samples of both of which (a "muster" of each) have been forwarded to the Society.

In regard to the first of these products, Mr. Henley says, that he has found the "munjeet," or Indian madder, to yield, when submitted to similar processes, all the different products obtainable from the madder of Europe; such as, for instance, the substance "garancine," or the colouring-matter of the plant simply combined with carbonized vegetable matter, and obtained by mixing gradually an equal weight of concentrated sulphuric acid on powdered "munjeet," or madder; and then by washing out the acid thoroughly with cold water. The process requires considerable care and management to prevent too great heating of the materials; and in Mr. Henley's experiments the vessels were kept plunged in cold water during the operation. It would appear that all the colouring matter of four tons of munjeet, as at present packed, might be packed in the space of one ton; although in point of actual weight, it may be estimated that three tons of munjeet produce one ton of garancine. At present, from the bulky nature of munjeet, the charge for freight is so great as to render its export almost null. The advantages, therefore, which would result from this change of condition are very obvious. By the manufacturer, madder in the form of garancine, is preferred for several reasons; and the greater portion of French madders are now converted into garancine for the purposes of the dyer. It is desirable that the fullest practical information should be obtained on the subject of the garancine manufacture as now practised in France, commencing with the best processes for grinding the root to powder; with observations as to such modifications as might be necessary for rendering similar machinery available for grinding Indian munjeet; and members of the Society are solicited to aid in obtaining this information. Mr. Henley found that the reduction of such a tough and fibrous matter as munjeet, even to a coarse powder, was a matter of great difficulty. The method of employing the acid on a large scale, so as to obviate destructive heating,—the recovery of the acid,—processes of drying, powdering, &c., are all points which require attention. It is considered that such a manufacture, if once successfully introduced, is peculiarly well suited to India. The munjeet climber is found there in the wild and cultivated state, and covers an immense extent of country. The cheapness at which it can be produced, and the valuable colouring matter which it contains (perhaps the most valuable dye in existence, the madder red), prove the importance of the subject.

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[*] This season many Zemindars have applied for plants and seeds. For extension there will be upwards of three tons of seeds available.

The letter from Captain Hollings, relative to the second product mentioned above, has reference to a premium offered by the Society of Arts, last year, "for the importation of any new substance which can be successfully used as a substitute for caoutchouc." It would seem that the acrid juice of the "ak," or "akundo," has been employed for ages by the natives of India for various medicinal purposes; and the plant itself, and its preparations, to cure all kinds of nervous disorders. It has also been subjected by European practitioners to a regular set of experiments, and is stated to be efficacious for various complaints; but the proposed employment of the milky juice as a substitute for gutta percha has been but lately brought under the notice of the public.* Capt. Hollings is anxious to know what price this article will fetch in the English market. The above mentioned plant also yields a fibre, a specimen of which, in a bleached state, along with some thread, twine, cord, and rope made therefrom, have been likewise sent to the Society. Thus it will be seen that the "muddar," "ak," or "akundo," possesses several valuable properties; and it may be added, that it abounds more or less in most parts of India; and is so exceedingly hardy, that it thrives in soils where scarcely any other plant will grow. The downy filament contained in the follicle, or seed pod, forms a good stuffing for pillows, and for certain garments commonly worn by the natives.

## HOME CORRESPONDENCE.

### IMPROVEMENTS IN NAVIGATION AND METEOROLOGICAL OBSERVATIONS.

White Barns, Buntingford, Oct. 26th, 1853.

SIR,—I have to request you will submit to the consideration of the Council of the Society the accompanying specification † of my Patent for the Improvement of Navigation and Meteorological Observation.

The American Government are fully aware of the importance of continuous observation; and my prepared charts furnish the basis upon which these may be faithfully recorded. The apparatus may be easily attached to all steam-vessels, and particularly to those which are fitted with the screw propellers.

His Royal Highness Prince Albert, our respected President, as Master of the Trinity House, might order the Trinity Yacht to be fitted with a Channel-chart; and that establishment would have the credit of being the first to introduce an improvement which, in its consequences, may tend to increased confidence and security in all our maritime operations.

The Council must be aware of the difficulties which necessarily attend all new propositions. My object is to keep pace with the scientific exertions of other nations; and by a friendly combination of the efforts which are now making, and concentrating the information obtained in different parts of the world, a series of deductions might be established which would be invaluable in every point of view—not only as conducive to the advancement of science, but also to the safety of the mariner, whose existence depends upon a correct knowledge of the force and set of the currents of the ocean.

With the view of carrying out these objects, I should suggest the adaptation of an office, with an appropriate staff, for arranging the different communications and instructing young persons, so as ultimately to form a class, to be hereafter denominated Hydrographers. They would be thoroughly instructed in the use of the prepared charts; and as they advance in intelligence as observers, would be found of great importance, both for the public and commercial services. "No fact," therefore, "gathered in such a field as this, can come irrelevant to those who tread the walks of inductive philosophy; for in the hand-book of Nature, every such fact is a syllable: and it is by patiently collecting fact after fact, and by joining together syllable after syllable, that we may finally seek to read aright from the great volume which the mariner at sea and the philosopher on the mountain see spread before them."

The charts will be prepared upon the most approved plan for every particular occasion, and their development will be commensurate with the speed of the vessel, giving a faithful delineation of the path pursued, accompanied by a detailed account of such observations as it may be found necessary to make in the course of the voyage.

I shall have much pleasure in attending at the Society of Arts, with my models, if the Council think the subject of sufficient importance to interest the Members.

Your obedient Servant,
THOMAS HOBLYN.

The following are extracts from the specifications referred to by Mr. Hoblyn:

"This patent is directed to the accomplishment of two objects perfectly new in the art of navigation—first, by a self-acting mechanism, to trace out upon prepared charts the direction of a ship's motion, and the distance sailed; and, secondly, to adapt to an ordinary timepiece a chart, having the outline of any given line of coast inscribed upon it, and caused to revolve by clockwork in proportion to the ascertained mean speed of the vessel, so as to give by inspection an approximate knowledge of the part of the coast a vessel may be near at any particular time by the clock to which the chart is attached.

"A modification of the above arrangement for indicating the ship's course is described in the patent. Instead of passing a paper or chart over a drum, and causing the lines to be drawn by means of a pencil, the patentee uses a portion or segment of the surface of a sphere, on which is drawn the outline of the voyage. This segment

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* *Vide* JOURNAL OF THE SOCIETY OF ARTS, No. 40, p. 485.

† Vide *Mechanics' Magazine* for Jan. 8th, 1853.

is mounted upon a spindle or shaft centred by a pivot, and a counterpoise attached to the lower end of the shaft for the purpose of always keeping the segment in equilibrium. An electro-magnet is attached to the counterpoise, by means of which the segment is retained in its position, north and south, independently of the line of the ship's course; so that when the vessel is tacking, or under the influence of head winds, or other contingencies, the line upon the surface of the segment shall indicate the ship's course.

"A wheel or marker, having a number of fine points upon its circumference, is caused to revolve by means of an endless screw, actuated by the rotation of a vane, similar to the one represented. This marker, or indent, upon the surface of the segment, is a line which will be as near as possible a representation of the course in which the vessel is proceeding.

"The second portion of the invention consists of a circular chart, which is attached to the striking portion of a time-piece, but in such a manner that the chart shall revolve upon its centre at certain regular intervals of time, and also at a fixed rate of speed. The speed with which the circular chart revolves must be as near as possible in true accordance with the ascertained speed of the vessel. An index points out on the chart the particular portion of the whole coast the vessel may be passing. The circular charts are capable of being removed, so that any other chart constructed upon the same principle, and representing any other portion of coast the vessel may be despatched to, may be placed upon the spindle of the time-piece. It may also be applied, by the intervention of a drum and strap, to the moving power of the paddle-wheels or screw-propeller with equally good effect."

## FLAX, AND ITS PRODUCTS, IN IRELAND.

*Contributed by William Charley, Seymour-hill, Belfast.*

### LETTER II.

The board of trustees of the "Linen and Hempen Manufactures," so far as I can ascertain, was always composed of the leading men in this country. I have all their Reports before me from the year 1815 to 1828, and during this period I find the very highest of the nobility and gentry acting as trustees. This is very satisfactory, and shows the interest taken in the welfare of the nation by the lords of the soil.

The trustees met in Dublin at their house, near the Linen-hall, every Tuesday to transact business. Consirable drawbacks were allowed on the export of linens; and the English Parliament granted a yearly sum of 20,000*l.* for this purpose, and also for regulating and empowering the manufacture. Intelligent inspectors were appointed in the country districts; and without doubt, the following extract shows that some guardian power was required to watch its interests, and that some rather dishonourable exceptions existed among the generally well-intended landed gentry:

*Report for* 1815, *page* 53.

"A letter from the inspector for the province of Munster, respecting the levying of tolls upon linens in the town of Tralee, in the county of Kerry, was presented and read, and is as follows:

"Great Charles-street, 27th February, 1815.

"My Lords and Gentlemen,

"I have received information from Mr. Trant, the inspector for Kerry, that Sir Edward Denny, and his Agent, support the tax-gatherer in the town of Tralee, in persisting to exact a toll of 5 per cent. on all linens sold in that town, although he, the inspector, has frequently remonstrated against it. May it therefore please your honours to order such steps to be taken as to your wisdom may seem necessary, to put a stop to so illegal a practice.

"I have the honour to be,
"My Lords and Gentlemen,
"Your obedient Servant,
"Alexander Boyle.

"To the Trustees, &c., &c."

Ordered,—"That the solicitor do instruct the inspector of the county of Kerry, in the measures necessary to be taken by him for suppressing this illegal practice."

* * * *

The secretary to the trustees, Mr. Corry, appears to have been a very able man; and the reports contain so much interesting matter that I think I may make rather more copious extracts therefrom than I at first intended. The following is the subject of a petition presented in June, 1815.—(*See* Report 1815, page 133).

"Mr. James Barklie, a respectable linen-bleacher, of 'Linen Vale,' near Keady, has just been summoned to attend before the Rev. N. Smith, a magistrate of this county, on Monday, the 12th June, to answer a complaint maliciously preferred against him for using Lime in the whitening of linens in his bleach-yard. If the law in this case should be acted upon, it must prove ruinous to Mr. Barklie, as an individual, and destructive in its consequences to almost the entire trade of this country."

The reply is highy characteristic, and speaks well for the good sense of the trustees.

Ordered,—"That the Rev. Mr. Smith (the magistrate before whom the informations alluded to in the foregoing communications have been lodged) be acquainted, that inasmuch as the penalty against *bleaching with lime* remains unrepealed, this Board are of opinion that he must use his own discretion in the enforcement of it in the present instance; and that the bleachers who have forwarded the foregoing memorial be informed of this, our decision, and that they be at the same time acquainted, that if the law, as it stands at present, is likely to operate so injuriously to the trade, they ought to petition Parliament for an alteration in the Act, and the Board will attend to any application of theirs upon the subject."

The old law referred to was certainly framed in a very mistaken spirit. Only fancy a legislature settling the proper dye of a large calico-printing establishment in Manchester at the present day!—yet such an act would scarcely be more absurd than the one under which Mr. Barklie was summoned before the magistrate. In the best-managed bleaching concerns in the North, lime is *now* much in use; it is not only required for imparting the necessary causticity to highly-carbonated alkalis, but is also applied in making steeping solutions for coarse linens, and, combined with chlorine, forms a very active bleaching compound (though certainly not so safe a *base* as the more retentive soda). What a commotion would now be excited should some of our large bleachers be indited at "Quarter Sessions" for using lime; yet thirty-eight years ago they would have incurred such a risk!

Verily such exposures do not say much for the wisdom of the so-called "good old times." These remnants of ignorant legislation were, however, soon swept away they did as much injury to the prosperity of the linen manufacture, and trade in general, as the severe penal laws enacted by the Ministers against the Roman Catholics of Ireland did to the cause of "civil and religious liberty,"—that cause for which the good King William III. fought and triumphed. And here I may remark, that the progress of civilised improvement in Ireland has at all times suffered by the errors and divisions among her sons,—the wild excitement of party, the fierce enthusiasm of sectarian religion, as well as the love of unprofitable amusements, have contributed their quota to the backward condition of the fatherland. If Irishmen had joined together cheerfully to promote the general welfare of their common country, laying aside for a time (but not consequently yielding) their peculiar distinctive opinions—if all the proprietors of the soil had made a rule of residing at home during the greater portion of the year —if the large and liberal views of William the Third had been carried out, and if the English Government had not, in the last century, oppressed the country by partial and impolitic legislation,—Ireland might now be classed among the first nations of the earth. As it is, she is, unfortunately, too often an object of pity to some, and contempt to others. The foibles of her children are a constant source of ridicule; and though she rightfully claims some of the greatest and best of men* as native-born Irishmen, this term of nationality is frequently used in other countries by the ignorant and prejudiced as a by-word and a reproach!

This is not as it should be; and yet it must be admitted that no one can travel through Ireland without perceiving the marked difference between the north and east of the country, and the south and west; the *Anglo*-Irish and Scotto-Irish blood, coupled with the profession of Protestantism, everywhere appears identical with enlightened progress. Did all the towns of Ireland resemble Belfast, Irishmen might be proud of their country; and yet, in natural advantages of situation and fertility of soil, the north is by no means more happy than the south: indeed the latter, in these respects, has perhaps the advantage, and it certainly has a superior *climate*.

This is, however, a digression from my subject, to which I must return. Towards the end of the year 1815, the attention of the Linen Board was directed to some improvements, proposed and brought under their notice by an English gentleman named Lee. The object of Mr. Lee was almost identical with the present attempt of the Chevalier Claussen,—namely, the management of flaxen fibre without any retting process; and neither of these gentlemen at any time succeeded in converting to their views the practical manufacturers engaged in the trade; and as want of success cannot be ascribed to any want of trial, I intend on a future occasion devoting an entire paper to the subject, and shall endeavour to point out therein the causes of their failure.

It may not be generally known that the Linen Hall, in Dublin, in old times, was the mart to which all the merchants repaired with the cases of bleached linens finished, and ready for sale.

There the English traders attended, and made their purchases; in those days the means of communication into the country were few, and the system of one grand central market answered all parties admirably; the development of new roads through the island, and the rising steam fleet of Belfast, eventually broke up this monopoly; the Irish merchants found their way across the Channel to London and Manchester, where they appointed agents to sell their goods, instead of troubling the buyers to come to Dublin. After the breaking-up of this great market, the dissolution of the Linen Board soon followed: in fact, the trade was no longer under its control, and the intelligent linen-merchants were getting far in advance of the trustees in the knowledge of the manufacture. It was my intention to finish my brief history of the Linen Board in this letter, but I have already written so much, and I have so much yet to say, that I must conclude for the present. If, however, the subject is at all interesting to your readers, I shall devote another paper or so to illustrating the operations of this important Board.

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* The warrior Wellington, the statesman Edmund Burke, the poet Goldsmith, the learned Swift, the eloquent Sheridan, and a host of others.

## CHEMISTRY AND PERFUMERY.

SIR,—When such periodicals as "Household Words" and the "Family Herald" contain scientific matters, treated in a manner to popularise science, all real lovers of philosophy must feel gratified; a little fiction, a little metaphor, is expected, and is accepted with the good intention with which it is given in such popular prints; but when the *Journal of the Society of Arts* reprints quotations from such sources, without modifying or correcting their expressions, it conveys to its readers a tissue of fiction rather too flimsy to bear a truthful analysis.*

In the article on Chemistry and Perfumery, in No. 47, you quote that "some of the most delicate perfumes are now made by chemical artifice, and not, as of old, by distilling them from flowers." Now, Sir, this statement conveys to the public a very erroneous idea; because the substances afterwards spoken of are named essences of fruit, and not essences of flowers, and the essences of fruits named in your article never are, and never can be, used in perfumery. This assertion is based on practical experience. The artificial essences of fruits are ethers: when poured upon a handkerchief, and held up to the nose, they act, as is well known, like chloroform. Dare a perfumer sell a bottle of such a preparation to an "unprotected female?"

Again, you quote that "the drainings of cow-houses are the main source to which the manufacturer applies for the production of his most delicate and admired perfumes."

Shade of Munchausen! must I refute this by calling your attention to the fact that in the south of France more than 80,000 persons are employed, directly and indirectly, in the cultivation of flowers, and in the extraction of their odours for the use of perfumers? that Italy cultivates flowers for the same purpose to an extent employing land as extensive as the whole of some English counties? that tracts of flower farms exist in the Balkan, in Turkey, more extensive than the whole of Yorkshire? Our own flower farms at Mitcham, in Surrey, need not be mentioned in comparison, although important. These, Sir, are the main sources of perfumes. There are other sources at Thibet, Tonquin, and in the West Indies; but enough has been said, I hope, to refute the cow-house story. This story is founded on the fact that Benzoic acid *can be* obtained from the draining of stables, and that Benzoic acid has rather a pleasant odour. Some of the largest wholesale perfumers use five or six pounds of gum Benzoic per annum, but none use the Benzoic acid. The lozenge-makers consume the most of this article when prepared for commercial purposes; as also the fruit essences. Those of your readers interested in what *really is* used in perfumery, are referred to the last six Numbers of the "Annals of Pharmacy and Practical Chemistry," article "Perfumery." Your obedient Servant,

SEPTIMUS PIESSE.

## PROCEEDINGS OF INSTITUTIONS.

LEAMINGTON.—The Seventh Annual General Meeting of the Royal Leamington Literary and Scientific Institution was held in the Reading-room on Wednesday the 12th instant. Mr. Overell, the Honorary Secretary having briefly opened the proceedings, read the report which congratulated the members on their having so far attained the object they had so long had in view as meeting within the walls of a building intended for their accommodation; and although the Committee regretted that the lecture hall was not in so forward state as to admit of their holding that meeting in it, yet they hoped that at the commencement of the ensuing year they would be in a position to open it with a *soirée* such as would do credit not only to the Institution, but to the town itself. The report then pointed out the various advantages which had already resulted from the union of the Institution with the Society of Arts, the state of the finances, library, &c., and concluded by urging on the members increased exertions. The expenditure for the year amounted to 145*l.* 19*s.* 1*d.*, and the receipts to 145*l.* 6*s.* 3*d.* The officers appointed for the ensuing year were the Rev. J. H. Smith, President; F. Manning, Esq., the Rev. Dr. Burbidge, the Rev. W. Cleaver, the Rev. J. H. Davis, T. Sharp, Esq., Vice-Presidents; Mr. Overell was re-elected the Honorary Secretary. The library now consists of 1,239 volumes. In the course of a few months this Institution will be in the occupation of a lecture hall 80 feet long, 34 feet wide, and 28 feet high, beneath which there will be a large room intended for the purposes of a museum and a committee room. In front is a large house recently purchased, the rooms of which are devoted to the purposes of a reading-room, library, class-rooms, and accommodation for the librarian. To the house has been added reception rooms, and a handsome portico. The total cost is expected to be about 2,000*l.*

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* If our Correspondent had carefully read the article he so fiercely attacks, he would have seen that the authorities were Dr. Lyon Playfair's lecture, and Professor Fehling, in the *Wurtemberg Journal of Industry*.—ED.

READING.—On Tuesday sennight there was a soirée at the New Hall, in connection with the Literary and Mechanics' Institution. Mr. F. Pigott, M.P., presided, and in his opening address said that he feared the Institution had not been popular with the mechanics of the town, as they did not appear to have given it support. He thought the reduction in the rate of subscription for mechanics and artizans a good step. Mr. Keating, M.P., followed in the same direction, and spoke to the Lecture programme which the Institution had issued. In the course of the evening a glee party from St. George's Chapel, Windsor, performed "Evening's Twilight," "Spring's Delight," and "Sleep, gentle Lady;" and there was also a party of instrumentalists. Mr. George Grossmith recited the case of "Bardell *v.* Pickwick, for Breach of Promise of Marriage," and a piece called "Skying the Copper."

SOUTHAMPTON.—A special general meeting of the members of the Polytechnic Institution was held in the hall of the Institution in Hanover-buildings, on Tuesday sennight, to consider, and give a final decision on, the plan proposed by the Committee, for the purchase of the Victoria Rooms and grounds, and their adaptation to the purposes of the Institution. The meeting was very largely attended. Mr. J. R. Stebbing (one of the Vice-Presidents) took the chair, and introduced the business of the meeting in a few remarks on the eventful and important character of the proposition, with reference to the future condition of Southampton, as well as to the nterests of the Institution itself.—Mr. D. Geddes, Secretary to the Building Committee, then read the Report of the Committee, which stated, that the Institution had now arrived at that stage beyond which it could not proceed, without entering upon some such arrangement as that submitted for approval and support. The lease of the old premises would expire next year, and no nlargement which could be effected would meet the ncreasing wants of the Institution. The Committee herefore recommended the purchase of the Victoria Rooms, (which had been occasionally hired for lectures) t a sum of 4,000*l.*, including all fixtures and grounds. The proposed alterations had been estimated at 2,050*l.* These would include a new and capacious lecture-hall, of an amphitheatrical form, with seats for 1,800 persons, and every other accommodation of the most approved kind, with an entrance from the level of the pavement in Portland-terrace; a reading-room and library, most conveniently placed as regards light and access; a scientific, class, and model-room, a museum, committee-room, and, what has been hitherto much needed, a lecturers' retiring-room, waiting-room, cloak-rooms, kitchen, and all other conveniences necessary to so important a building. These arrangements were proposed to be effected without interfering with the present ball and card rooms, which, as well as the new great hall, the Committee thought should be let as heretofore, and would realize 650*l.* per annum; the Committee suggested that the necessary capital might be raised in shares of 1*l.* each, payable in four quarterly instalments—the shares to be transferable,—and each shareholder to receive interest on the capital, not exceeding five per cent., in the first instance; so that every member of the Institution might be enabled to secure at least one share in the projected undertaking. Should the demand for shares not be sufficient to meet the amount necessary for the alterations and improvements, the property might still be purchased for 4,000*l.* and the rest wait future results. The Report was adopted, there being only two dissentients, amid great applause; and the Committee were authorized to take all necessary steps for the purpose of carrying out the views therein expressed. About 1,100 shares were taken up in the room after the meeting, and since that time the number has been considerably increased.

TAMWORTH.—The anniversary meeting of the Midland Association of Mechanics' Institutes was held under the auspices of the Tamworth Library, on Tuesday last. The conference in the morning was attended by the Right Hon. the Earl of Yarborough, Sir Robert Peel, Bart., M.P., C. H. Bracebridge, Esq., Mr. P. Le Neve Foster, and the following Delegates from various Institutions:—Birmingham, Messrs. Lloyd, Hudson, Williams, and Blews; Boston, Mr. Adams; Derby, John Moss, Esq., Mayor, Douglas Fox, Esq., and Mr. Madeley; Chesterfield, Rev. W. Blythe and Mr. T. Warwick; Grantham, Mr. Buckley; Worksop, Dr. Heldram and S. Owen, Esq.; Leicester, Messrs. Hollings, Smallfield (Honorary Secretary), and Walker; Stafford, Mr. Maybury; Lutterworth, Mr. Iven. The Earl of Yarborough having left the chair, Sir Robert Peel, the newly-elected President, said that he had great faith in the Unions of Mechanics' Institutions, as they stimulated each other to greater activity. He then referred to the liberal manner in which certain of the leading publishing houses had, on a suggestion from the Society of Arts, consented to allow rates of discount varying from 25 to 50 per cent. to Institutions in Union with that body, in the purchase of books. After the reading of the Report of the proceedings during the past year, a discussion ensued among the delegates; when the following Resolutions were passed:—1st. "That it is the opinion of the delegates that the character of Lectures, and the mode of systematising the courses, need revision, so as to give them a more elementary, progressive, and popular character; and that all such Lectures should be accompanied, as far as possible, by contemporaneous class instruction under competent teachers." 2nd. "That it is highly desirable that a system of village libraries should be established, so as, if possible, to place an educational library in every populous village." In the evening a conversazione took place in the Town Hall, which was attended by a large number of the most respectable inhabitants of the town and neighbourhood. Among the company present were the Right Hon. the Earl of Yarborough, Sir Robert Peel, M.P., Mr. Bass, M.P., Mr. A'Court, M.P., Mr. M. D. Hill, Q. C., the Recorder of Birmingham, Mr. Adderley, M.P., Dr. Lyon Playfair, Mr. Monckton Milnes, M.P., the Mayor of Birmingham, the Mayor of Derby, Mr. C. H. Bracebridge, the Rev. E. Harston, Vicar of Tamworth, Mr. P. L. N. Foster, the Secretary to the Society of Arts, and Mr. W. S. Dugdale. **Sir Robert Peel**, in opening the proceedings, expressed the great pleasure he felt in witnessing so numerous an assemblage. He was glad to see around him such a distinguished body of practical men, and he thought he might be allowed to offer a few general observations which suggested themselves to his mind. They were celebrating the anniversary of an Institution the object of which was to improve the minds of their fellow men by the opportunities afforded at the present moment. Strictly speaking, they were a Peace Congress; their desire was to diffuse a taste for that peaceful knowledge which would be useful to all classes of the community. He was not going to ask them to side with the Crescent or to share the risks of the Cross, or to argue the evils attendant upon standing armies. That might be all very well at Edinburgh or Islington, but in the Midland Counties they required the public mind to be stirred up to the consideration and prosecution of more rational and more useful subjects. They desired to teach the artisans of the country some study which would be available in the sphere of employment which they occupied. For that object they had associated themselves together, and thought that great advantages would be derived by periodical meetings like the present, inasmuch as they would produce a sympathy between all classes such as that which they witnessed on that occasion. Sir Robert proceeded to observe, that the working men of the kingdom were equally intellectually endowed with others; but let them turn their eyes which way they might they would find that economy of labour was the most conspicuous subject to which, as regarded their interests and the interests of the public, their attention ought at the present time to be directed. With all their present means, when man reached manhood he was still behind hand. The hon. baronet expressed a hope that Parliament was about to inaugurate a measure of primary education applicable to the whole kingdom. Lord John Russell, beyond all other statesmen, was capable of digesting such a measure, but the task would be beyond the powers of any Government to accomplish, unless it received the co-operative support of the people. The acquisition of knowledge and the cultivation of the arts and sciences among classes of society hitherto deprived of them was the main object of the Mechanics' Institutions; and he (Sir Robert) could assure them that he would do all in his power to improve the moral, the social, and the intellectual condition of the working classes. Above all, he would exercise his best energies to diffuse the blessings of education, and thus strengthen those links which bound in one common chain all the varied interests of society. **Mr. Monckton Milnes**, M.P., being called upon to speak to the great intellectual improvement to be derived from the establishment of reading-rooms, said, he sympathized with all that had fallen from their excellent Chairman with respect to the practical advantages resulting from Mechanics' Institutions, and urged the importance of inducing reading among the working-classes. It was by books that they were taught the value of their social position in comparison with the social condition of working men in other countries. **Mr. Adderley**, M.P., in speaking of the necessity of early education, said he believed with Sir R. Peel, that without primary education the establishment of Mechanics' Institutions would be an imperfect work; and he urged that Government should find funds to support, permanently and efficiently, primary schools, worthy of Great Britain, in every parish in the kingdom. **Dr. Lyon Playfair** complained of the great want of systematic primary education. The Mechanics' Institutions had not done all which their founders had anticipated, but they had, nevertheless, done much good. He said that the desultory system of lectures was pernicious, but that experience had shown that if good lectures were afforded, mechanics and artisans would take advantage of them. The Government were anxious to render all the assistance they could towards the promotion of education; and in the department with which he was connected, they had already made great progress towards affording the public the means of obtaining useful literature at a cheap rate. The **Earl of Yarborough** urged the necessity of union among Mechanics' Institutions, and believed that in so doing he was honestly recommending what would be advantageous to the working population, as well as to the wealthier classes of society. If they who enjoyed riches, bestowed upon them by Providence, were not willing to dispense them for the benefit of the people, they would, in his opinion, lose caste, and become, as they deserved to be, unhappy men. He thought great benefits would be derived from the circulation of books by reading societies, but, in his opinion, comparatively little good would be accomplished unless they made the home of the poor man comfortable—unless they rendered it preferable to the public-house. After addresses from Mr. Hill, Q. C., Mr. C. H. Bracebridge, the Mayors of Birmingham and Derby, Mr. P. Le Neve Foster, and the passing of the usual votes of thanks, the meeting, which was a highly-gratifying one separated.

## TO CORRESPONDENTS.

Erratum, in p. 587, first column, line 30, for *preserved alive in spirits, and others slightly opened*, read *preserved alive, and others in spirits, slightly opened.*

Want of space prevents the insertion of Letters from Mr. Campin on "Patent Law," and by "Mercator," on "Gratuitous Lectures;" also, Notices of the Uxbridge and Windsor Institutions.

## MEETINGS FOR THE ENSUING WEEK.

**Wed.** Geological.—Mr. J. W. Dawson, "On the Coal Measures of the South Joggins, Nova Scotia;" Messrs. H. Poole and J. W. Dawson, "On the Coal Measures at Albion Mines, Picton, Nova Scotia;" and Mr. Trimmer, F.G.S., "On the Superficial Deposits of the Isle of Wight."

## MISCELLANEA.

**Property in Inventions.**—Colonel Vergnaud, of the French Artillery, some time since memorialised the Minister of War for a grant of money by way of reward for certain inventions by him of the application of fulminating mercury to the priming of guns. The Minister rejected his application, on the ground that in reality these applications were known before; but in doing so, enunciated the following somewhat startling doctrine: That an officer in the army devotes himself entirely to the service of his country, and that the produce of his labours and of his genius belong solely to it; and that if he needs any other recompense than that which is to be found in his conscience, and the performance of his duties, the approbation of his commander and the satisfaction of the Minister of the Department ought to be all-sufficient. Upon this Colonel Vergnaud again memorialised the Minister, pointing out that in making his claim he was doing nothing more than had been previously done by others in the service, who had had their claims admitted, and rewards in money granted. He did not admit the doctrine, that an officer entering the army devoted all the produce of his labours of mind and body to the State, alleging that such a doctrine was at variance with moral and intellectual progress—the aim of all society; for it took away from individuals the hope of reward. He characterises the doctrine as unworthy the enlightenment of the times, and fitted only for the days of Louis XIV.

ARTIFICIAL PRODUCTION OF DIAMOND POWDER.—Some considerable sensation has been produced in the scientific circles of Paris by the announcement of the artificial formation of diamond powder. M. Despretz has made two communications to the Académie des Sciences, upon carbon. In these he states, that placing at one, the inferior pole of a voltaic battery, a cylinder of pure charcoal (its purity being secured by preparing it from crystallized white sugar candy), and at the superior pole a bundle of fine platinum wires, so arranged that the charcoal was in the red portion of the electric arc, and the platinum in the violet, he found the carbon volatilized and collected on the platinum wires in a changed state. In these experiments the current has been continued during a month in activity, and the powder collected on the wires has been found to be sufficiently hard to polish rubies with great rapidity, and when burnt it left no residue. M. Despretz asks himself,—Have I obtained crystals of carbon which I can separate and weigh, in which I can determine the index of refraction and the angle of polarization without doubt? No: I have simply produced, by the electric arc, and by weak voltaic currents, carbon crystallized in black octohedrons, in colourless and translucent octohedrons, in plates also colourless and translucent, which possess the hardness of the powder of the diamond, and which disappear in combustion without any sensible residue. A similar result has been obtained by decomposing a mixture of chloride of carbon and alcohol, by weak galvanic currents. The black powder deposited was found to possess equal hardness with that which was sublimed, and rubies were readily polished by it. A few years since, graphite and coke were formed from diamonds; we now appear to be advancing towards the conversion of graphite and coke into diamonds.—*Athenæum.*

STATISTICS OF COTTON.—The following statistics of the cotton trade of the United States, shows the extent of the crop each year for the past eight years, and also the proportions in which it has been distributed throughout Europe and America:

| | Total Crop. | Receipts at N. Orleans. | Average Price. |
|---|---|---|---|
| | Bales. | Bales. | Cents per lb. |
| 1845-6 .................. | 2,100,537 | 1,041,393 | 6⅞ |
| 1846-7 .................. | 1,778,651 | 707,324 | 10 |
| 1847-8 .................. | 2,347,634 | 1,188,733 | 6¾ |
| 1848-9 .................. | 2,728,596 | 1,100,636 | 6½ |
| 1849-50.................. | 2,096,706 | 797,387 | 11 |
| 1850 51.................. | 2,355,257 | 995,036 | 11 |
| 1851-52.................. | 3,015,029 | 1,429,183 | 8 |
| 1852-53 (estimated). | 3,220,000 | 1,664,864 | 9 |

The total receipts of bales at New Orleans for the twelve months ending September 1, 1853, were 1,664,864; being an increase of 210,000 bales over the previous year, which had been the largest ever known before. The entire exports from New Orleans, from September, 1852 to September, 1853, were 1,644,981, distributed through the world in the following proportions: to Great Britain, 922,086; to France, 211,526; to the north and south of Europe, 244,678; and to the United States' ports, 266,696. This gave an increase of exports to England of 150,846 bales, 15,272 to France, 35,514 to the north and south of Europe, and 10,250 to the United States' ports. The importance of the British cotton-producing colonies cannot therefore be overrated; especially when it is remembered that notwithstanding the import to the country of not less than six times the usual quantity of cotton from the East Indies, it is found that the total supply of cotton wool in Great Britain for the first six months of 1853, was 2,182,250 bales; being an increase of 286,287 bales over the same period of the previous year.

SYSTEMATIC EDUCATION.—A meeting of a few friends of education was held at Mr. Hugo Reid's, on the 21st instant, to discuss the subject of the education of those, of all classes, who are sent early to business. It was moved by Dr. Purvis, seconded by Mr. John Shore; and, Resolved,—"That provision for the continuance of the systematic education of those who are taken early from school, and for the useful occupation of their leisure time, is a want, the importance of which is not yet sufficiently estimated." It was moved by Dr. D. B. Reid, seconded by Mr. R. H. Church; and, Resolved, —"That this want can be supplied only by a regular and well-defined course of study, including the leading branches of general knowledge, advancing systematically from the more simple to the more complex subjects, extending over several years, conducted by competent persons, forming one complete and coherent system, and impressed upon youth as a great educational work they have to perform, to qualify themselves properly for the business of life." A local Committee was appointed to consider the best means of establishing such a course of study for young persons in Greenwich and the vicinity.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 21st October, 1853.*

*Dated 25th May, 1853.*

1281. W. Bauer, Munich—Construction of vessels to be used at various depths under the surface of water, and machinery for propelling, &c., and for carrying on various operations on or under the surface of the water from within upon objects without.

*Dated 9th September.*

2073. P. Grant and J. Doherty, Manchester—Cutting and finishing brass rule and wood reglet used in letter-press printing, and machinery for same.

*Dated 12th September.*

2111. L. A. Brocot, Paris—Astronomical calendar.

*Dated 17th September.*

2163. A. J. Baker, 51, Burton-crescent, London—Strengthening vessels of timber or iron.

*Dated 19th September.*

2171. C. Collins, Hartford, Connecticut—Manufacture by machinery of tubes from leather, &c., chiefly for covering the drawing-rolls of spinning-machinery.

*Dated 26th September.*

2213. F. F. Clossmann, 16A, Park-lane, Hyde-park—Production and application of certain materials for textile fabrics, &c.

*Dated 1st October.*

2243. J. Summerscales and B. Bancroft, Keighley, Yorkshire—Weaving-shuttles.
2245. T. Woodcock, Pulteney-terrace, Islington—Machinery for carving, cutting, chiselling, and engraving.
2247. J. M. Letestu, Paris—Propelling ships.
2249. J. Ambler, Manningham, near Bradford—Preparing and combing wool, &c.
2251. R. Halliwell, Bolton-le-moors, and W. Johnson, Farnworth, Lancashire—Spinning-machinery and grinding-cards.

*Dated 3rd October.*

2253. Commander M. Dwyer, Unity-place, Samuel-street, Woolwich, and J. Brown, 2, Bridge-terrace, Mile-end—Anchors.
2255. W. J. Thompson, North Shields—Heating reverberatory and other furnaces. (A communication.)
2257. J. Leadbetter and W. Wright, Halifax—Machinery for raising fluid or solid substances.
2259. A. Stanistreet Jee, 6, John-street, Adelphi—Rails for railways.

*Dated 4th October.*

2261. P. R. Jackson, Salford—Machinery for manufacturing hoops and wheels.
2263. H. J. Jordan, Berners-street—Medicine for venereal affections, called, "The Treisemar." (A communication.)
2265. W. Crofts, Derby-terrace, Nottingham—Weaving.
2267. N. Smart, Merton, Surrey—Brick manufacture.
2269. W. Gossage, Widnes, Lancashire—Obtaining saline compounds from solutions.

*Dated 5th October.*

2271. J. Holmes, Portsea—Canteens for soldiers, &c.
2273. J. Wright, Rochester—Apparatus for landing and embarking passengers from steam and other boats.

2276. H. J. Betjeman, New Oxford-street—Apparatus for fixing capsules on necks of bottles, &c.
2277. S. L. Worth, 293, Oxford-street, and A. D. V. Canavan, Fitzroy-street—Improved polishing surface.
2279. J. Mason, Rochdale—Preparing cotton for spinning, &c.

*Dated 6th October.*

2281. J. Milner, Stratford, Essex—Steam-engines.
2283. J. H. Cary, Norwich—Improved pianoforte-action.
2285. M. F. de Castro, Madrid—Preventing accidents on railways.
2287. H. Goddard, Castle-gate, Nottingham—Improvements in stoves and kitchen-ranges.
2289. J. Rubery, Birmingham—Umbrella and parasol-furniture. (A communication.)

*Dated 7th October.*

2291. G. Ellins, Droitwich—Threshing-machinery.
2293. J. Bullough, Accrington, J. Walmsley, and D. Whittaker, Blackburn—Machinery for warping and sizing yarns, &c.
2295. J. H. Johnson, 47, Lincoln's-inn Fields—Apparatus for compressing or rarifying air, &c. (A communication.)
2299. T. Lambert, Short-street, New-cut, Lambeth—Ships' water-closets.
2301. F. and W. Whitehead, Crayford, Kent—Improvements applicable to lamps and reflectors.

*Dated 8th October.*

2305. J. Denton, Prestwich—Looms.
2307. W. Wilkinson, Nottingham—Protecting telegraph-wires.
2309. W. Potts, Birmingham—Mantelpieces.
2011. C. May, and J. Samuel, Great George street, Westminster—Joining ends of rails of railways.
2313. W. E. Newton, 66, Chancery-lane—Fire-arms and cartridges. (A communication.)

*Dated 10th October.*

2315. H. Rawson and T. Whitehead, Leicester—Regulating flow of air to boiler-furnaces.
2317. G. Fergusson Wilson, Belmont, Vauxhall—Manufacture of candles, &c.
2319. F. Warner and J. Shotton, Crescent, Jewin-street—Manufacture of large bells.
2321. H. L. Pattinson, Scot's-house, Gateshead—Manufacture of sulphuric acid.

*Dated 11th October.*

2323. H. Kemp, Barkham-terrace, Southwark—Preparation of wood for sheathing ships, &c.
2325. L. A. F. Demoulin, 17, Rue Sedaine, Paris—Apparatus for common road-carriages, to prevent accidents and increase power.
2327. D. Dick, Paisley—Manufacture of flexible pipes.
2329. J. Worrall, jun., Salford—Dyeing fustians, &c., and machinery for same.
2331. J. H. Nalder, Alvescott, and J. T. Knapp, Clanfield, Oxfordshire—Winnowing corn.
2333. J. Harris, Hanwell—Apparatus for heating water, &c.
2335. J. Webster, Leicester—Water-gauges for steam-boilers.
2337. B. Couvan, Fenchurch-street—Signals on railways.

APPLICATIONS WITH COMPLETE SPECIFICATIONS FILED.

2340. T. B. Warée, Paris, and 16, Castle-street, Holborn—Apparatus for measuring pressure of air, steam, &c. (13th Oct., 1853.)
2380. A. E. L. Bellford, 16, Castle-street, Holborn—Treatment of copper ores. (A communication.) (15th Oct.)
2381. C. J. L. Cloux, jun., 16, Castle-street, Holborn—Process for preparation of hemp after the stripping. (15th Oct.)
2385. A. Corvi, Paris, and 16, Castle-street, Holborn—Improvements in organs. (15th Oct.)

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 20th October, 1853.*

950. John Smethurst, of Manchester—Invention of an improved plan for packing yarn and other materials.
951. Samuel Weight, of Cheltenham—Improvements in ventilating mines, sewers or drains, ships, buildings generally, and other localities.
952. Emile Chappuis, fils, of St. Mary Axe—Invention of an improved apparatus for the diffusion of light, to be called the "Myriastratic reflector."
953. Henry M'Evoy, of Birmingham—Improvements in the construction and manufacture of door-bolts.
960. Charles Reeves, jun., of Birmingham—Improvements in swords.
964. Philip Harris, of Chatham—Improvements in fire-arms.
965. William Robjohn, of Islington—Invention of an improved meter for measuring and indicating the measure of liquids.
976. Edward Onslow Aston and George Germaine, both of Millwall—Improvements in compositions for coating wood, metal, and other materials exposed to the action of sea-water or the weather.
986. Richard Johnson, of Manchester—Improvements in machinery or apparatus for drawing wire.
987. Edward O'Connell, of Bury, Lancashire—Improvements in the mode or method of feeding infants and invalids, and in apparatus connected therewith.
989. Charles Léon Desbordes, of Paris—Improvements in instruments for measuring the pressure and temperature of air, steam, and other fluids.
990. John Chatterton, of Birmingham—Improvements in covers for wagons, carts, and other vehicles.
993. James Emery, of Preston—Improvements in the construction of gigs, dog-carts, and other vehicles.
995. Julian Bernard, of Guildford-street—Improvements in casting metals, and in moulding or forming other materials.
1006. Frederick George Underhay, of Well-street, Gray's-inn-road—Improvements in reaping and mowing-machines.
1031. James Berry, of Horwich, near Bolton, and Thomas Booth, of Chorley—Improvements in machinery or apparatus for printing or staining woven fabrics and paper.
1033. William Hart Sitwell, of Sydenham—Improvements in projectiles for cannon and fire-arms.
1034. Sir John Scott Lillie, of South-street, Finsbury—Improvements in roads, floors, footways, and other like surfaces.
1043. Jacques Stanislas Vigoureux, of Rheims—Improvements in the combing of wool and other fibrous materials.
1064. François Monfrant, of Paris—Improvements in lubricating materials. (A communication.)
1135. John Fisher, of Liverpool—Improvements in machinery for propelling vessels, and in the mode of manufacturing the same.
1149. George Roberton and Alexander Roberton, both of Bradford, Yorkshire—Improvements in apparatus for drying and finishing woven fabrics.
1187. Edward Taylor Bellhouse, of the Eagle Foundry, Manchester—Improvements in steam-boilers.
1245. Charles de Bergue, of Dowgate-hill—Improvements in the permanent way of railways, and also in chairs and in sleepers for permanent way.
1298. Charles Cowper, of Southampton-buildings—Improvements in the manufacture of iron. (A communication.)
1351. John Robert Johnson, of Stanbrook-cottage, Hammersmith—Improvements in the manufacture of type and articles used in letter-press printing.
1359. William Boyd, of Belfast—Improved apparatus for manufacturing chlorine or chlorides.
1519. Juste Giret, of Paris—Improvements in artificial and malleable stones, and in the apparatus to be used for such purposes.
1623. John Knox Stuart, of Glasgow—Improvements in hats and other coverings for the head.
1773. Theodore Dethier, of Pimlico—Improved machine for mortising, drilling, and boring.
1885. Richard Archibald Brooman, of Fleet-street—Invention of certain new compounds, which may be employed for mouldings, frames, and many purposes to which wood, papier-maché, plaster, gutta-percha, and other like substances are applicable. (A communication.)
1901. John Gwynne, and James Egleson Anderson Gwynne, both of Essex-wharf, Strand—Improvements in the preparation or manufacture of fuel.
1927. George Leedham Fuller, of St. Mary's-road, Peckham—Improvements in steam-engines.
1947. Robert Moore Sievier, of Louviers, France—Improved machinery for the manufacture of terry or cut pile fabrics, parts of which are applicable to the weaving of other fabrics.
1955. Frederick Osbourn, of Albion-street, King's-cross—Improved machinery for cutting woven and other fabrics.
1959. James Webster, of Leicester—Improvements in pressure-gauges.

*Sealed 24th October.*

998. George Kennedy Geyelin, of Camden-town—Improvements in the manufacture of white oxide of zinc.

*Sealed 26th October.*

1002. Auguste and Jean le Roy, and Eugène Pavy, all of Paris—Improvements in the production of lace and other fabrics.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Oct. 24 | 3521 | "Bennett's Locomotive Regulator"...... | John Bennett .................. | 65, Cheapside, London. |

# SOCIETY OF ARTS.

**FRIDAY, NOVEMBER 4th, 1853.**

## MEETING OF COUNCIL.

*Wednesday, Nov. 2nd.*, 1853.

At a Meeting of Council, held on Wednesday, the 2nd inst., the following Institutions were taken into Union:

298. Hampton (Middlesex), Literary Society.
299. Hereford, Permanent Library.

## NOTICE TO INSTITUTIONS.

As the time is now approaching for the receipt of the book-orders, the Secretary to the Society of Arts would be particularly obliged by the different local Secretaries adhering strictly to the instructions given in the Circular, dated Oct. 13th, accompanying the table of the rates of discount to be allowed by the Publishers. It is obvious, that, unless one uniform plan is followed, there would be much confusion and unnecessary labour; and it is hoped that all parties will assist in making the arrangement as practically serviceable as possible.

## PRACTICAL OBSERVATIONS ON SURVEYING AND LEVELLING.

By Thomas Sopwith, F.R.S.

### INTRODUCTION.

A few years ago several schoolmasters formed themselves into a local society, chiefly connected with Northumberland, Durham, and Newcastle-on-Tyne (three separate *counties*), for the purpose of holding quarterly meetings, and having papers read and discussed on matters relating to Education. This Society having expressed a wish (16th February, 1848) to receive from Mr. Sopwith some information on the subject of surveying and levelling, he accordingly drew up the following paper.

Mr. Sopwith's object was to divest the subject of much of the laborious prolixity and antiquated style which hung over it, as usually treated; to infuse a new occupation into schools; and to afford general information on a subject too little known, especially by barristers. The understanding of models, plans, and sections, by Judge, Counsel, and Jury, is at times of the most serious importance in the determination of questions of enormous value; and to each and every one a correct eye for maps, plans, and diagrams, is of constant usefulness.

The Council wish to take this opportunity of thanking Mr. Sopwith for his communication,—which is the more valuable at the present time from the fact of the strenuous efforts now being made to introduce into ordinary school education objects of practical utility. It is gratifying to reflect that a gentleman of Mr. Sopwith's distinguished attainments, and whose professional avocations are so onerous, can yet find time, and have the inclination, to aid in advancing the general spread of knowledge throughout the country.—*Sec. Soc. of Arts.*

In an admirable address, recently delivered by the Dean of Durham to the members of the Gateshead Mechanics' Institution, it is truly observed, that education, properly so called, is not limited to boyhood or youth; it ends not at twelve, or thirteen, or twenty years of age,—"the wise man's education ends only with his life." It is the province of the schoolmaster only to commence the course of that comprehensive education, which extends through life—to sow the seeds of future acquirement, and to embrace, as far as possible, the various objects which may prove of future benefit to the pupil. This enlightened view of education is daily becoming more general. The teacher, looking beyond what have hitherto been deemed the rudiments of education,—which, indeed, in many schools rarely went beyond a moderate proficiency in reading, writing, English grammar, and arithmetic; has now, in many instances which have come within my own observation, included the study of natural history, and of many sciences, a knowledge of which, rightly directed, cannot fail to be of essential service in after life. A few weeks ago I visited a school in Edinburgh, where, amongst the humblest class of scholars, were found boys capable of explaining the action of the air-pump, locomotive engine, &c.; and I know that in this town philosophical and scientific apparatus have been extensively applied in the service of education. The request which has been made to me by the members of the Society whom I have now the honour to address, is an evidence of the desire which prevails to add to the practical character of the instruction imparted in the ordinary schools of the district; and as education extends throughout life, so may it in early life very properly embrace whatever is likely to be useful in future and more advanced years.

Plain surveying has been included as a branch of education in many schools, and has formed the subject of various books written expressly for the use of schools. Levelling has been less generally taught, but its general principles have received ample illustration in various able works with which intelligent teachers are well acquainted. In endeavouring to comply with the request which this Society has done me the honour to make, it will be my aim to present such general views as are adapted to the present times, and are at the same time within the scope of ordinary tuition,—to offer some observations on the use and advantages of the practice of surveying and levelling,—to describe the elementary branches of knowledge required by the student in this department, and to bring the general subject into as condensed and explanatory a form as is consistent with the brief period to which I am limited on the occasion of your meeting in this place.

In the first place, then, I may observe, that surveying and levelling have within the last twenty years acquired a place in public estimation far exceeding that which previously obtained when most of the works to which I have alluded were composed. The railway system, which has wrought so many changes, has given a great additional value to the art of surveying and levelling, which indeed has sprung up from comparative obscurity to be a lucrative profession: and here I think it by no means out of place to observe, that it was from my *schoolmaster* (Mr. Henry Atkinson, of this town), that I first obtained a knowledge of the practice as well as the principles of surveying. I mention this, because it gives force to what I have to urge on this Society,—that important and valuable results in after life may flow from such practical education in the arts and sciences; and the more such proficiency is required, so much the more important is it to prepare youth for acquiring it. At the close of this paper, I purpose, in a recapitulation of the subjects now to be brought under consideration, to show how generally such a knowledge may be applied with advantage alike to the teacher, the pupil, and the public.

I need scarcely observe, that as a branch of education any instructions in surveying and levelling must necessarily be preceded by a considerable proficiency in the first rudiments of learning. When the student is sufficiently advanced in ordinary reading, writing, and arithmetic, his first lessons in the departments which form the subject of this paper are to acquire the peculiar reading, writing, and arithmetic, which appertain to the practice of surveying and levelling. He is now required to "read," as the expression is, other pages and other objects than ordinary books present. To read the theodolite, levelling stave, or common scales, is only to be acquired by practice, and may form indoor lessons before attempting any practice in the field. To be able to "read" the compass, is as necessary for the surveyor as the sailor; and a series of lessons by means of appropriate diagrams would be not less entertaining than useful to young pupils, for it cannot have escaped the attention of those whom I address how much children are attracted by moveable diagrams or models. The vernier scale, for example, affords a good illustration both of the particular mode of instruction, and its general application. I would recommend that such a scale, showing, for instance, ten parts with a moveable scale of the same length divided into nine parts,* should be exhibited in the school-room, when not only the intended pupils in surveying, but the pupils generally of more advanced classes might learn to read off divisions to the hundreth part of the space occupied,—say, one foot; and if a barometer with such a scale was within reach, the practical and popular nature of this instruction would be made apparent. In like manner the graduations on the face of the compass—on levelling staves, and on ordinary scales, are to be learned by a process of reading accompanied by proper explanations. This is really the A, B, C, of surveying and levelling. Fig. 1, represents a graduated circle, the ordinary reading of which requires no explanation; but the reading of the surveying dial is altogether different. The line of sight in which the observation is taken, lies over the north and south line, marked N S. This is to be placed in any required direction; and being fixed, the magnetic needle is found to rest, we will suppose, in the position marked by the dotted line, A B—the north end of the needle resting at 24° distant from the north and south line. The reading of this is not N 24° W, as would at first be supposed from the contiguity of the letters denoting north-west,—but N 24° E. The reason of this is apparent, on considering that the needle is the only representative of the magnetic bearing; if therefore a corresponding line, C D (Fig. 2), is drawn on paper, the end C will represent the magnetic north. The line N S coincides with a line in the direction of some object—say a fence, which on the plan will be represented by a line, E F, parallel to N S; and this line of direction, E F, is clearly seen to be on the east side of the magnetic meridian, and forming with it an angle of 24°. It is unnecessary to advert to this in any further detail; but it exemplifies what in the language of surveyors is called "reading" the dial,—an aptitude in which requires some little practice. In Fig. 3, is a representation of the vernier scales, to be "*read*" in like manner; and I add an illustration of the manner in which the pupil's eye is to be familiarised to the value of different scales. The equality of one mile with 80 chains, 1,760 yards, and with 5,280 feet, is easily explained by dividing equal lengths into corresponding divisions; but whatever be

Fig. 1.

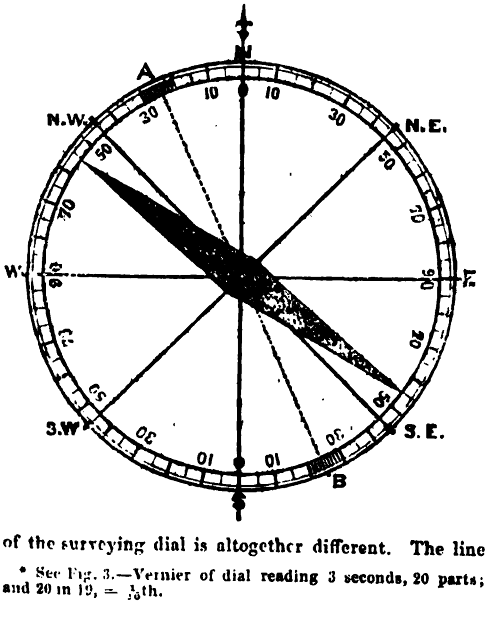


Fig. 2.

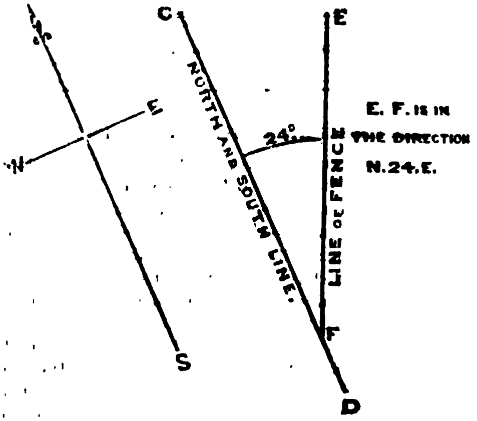
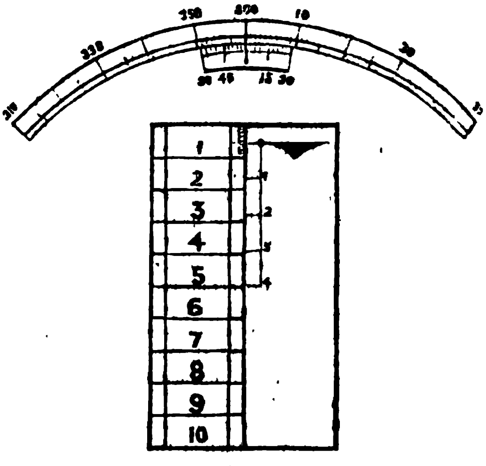


Fig. 3.—*Vernier Scales.*



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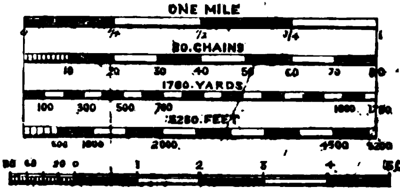
* See Fig. 3.—Vernier of dial reading 3 seconds, 20 parts; and 20 in 19, = $\frac{1}{20}$th.

the denomination of the scale, the most useful mode of drawing it on a plan, and of reading it, is to show only one series of the smaller divisions (usually ten) on the left of zero, and commencing with a larger series on the right hand, Fig. 4. The convenience of this for measuring is obvious on inspection, but it is by no means universally adopted. The graduations on different levelling staves require a little attention before they can be read with facility; and in all schools where any instruction is intended to be given in surveying and levelling, I recommend that diagrams illustrating the above and similar details be provided as alphabets of the art.

Fig. 4.



Nor is the writing practised in surveying and levelling less peculiar; the best form of field-books being so arranged as that the writing in them commences at the end of the book and bottom of each page. Independently of this, it is requisite that the surveyor write both quickly and clearly,—*quickly*, because his assistants are detained if much time is taken up in recording observations; and *clearly*, because the mistake or doubt of a single figure may cause great inconvenience and delay. Many persons are apt to get into a careless method of making their minutes, because they can understand their own writing; but in extensive surveys it may and does often become necessary that the books are to be transferred, and plottings laid down by one party from the field-books of another. In school practice I recommend that this be constantly done; that the form, arrangement, and details of keeping the field-books, being based on a proper system, the work of each pupil may be tested by an interchange of books. Moreover, it is desirable in most cases to preserve the field-books as a record, and hence the greater occasion for their being as clear and explanatory as possible; and though the surveys made by schoolboys are not likely to be of any permanent value, it is well that the habit of care and uniformity should be carefully matured. Above all things, then, the pupil should avoid arbitrary and unmeaning marks, made with the view of trusting to memory. First let him learn to write correctly the descriptions and dimensions required for the survey, and afterwards acquire rapidity of execution. Moreover, in writing any schedule of the property surveyed, or any description or report, such as a student in surveying should be occasionally exercised in, great care should be taken to have clear and distinct ideas concisely expressed and written in a plain handwriting. Nor is ordinary writing alone required; it is requisite that the young surveyor devote great care to the penmanship of neat lettering, aiming first at well-formed letters, and afterwards at some moderate degree of ornament—which, indeed, is best attained by care in the execution of such lettering as is necessary. Much of the ornament which appears in old surveying books is now wholly dispensed with, and hence the greater need for a simple and unpretending elegance, which forms the highest species of ornament in the eye of correct taste. There is also another description of writing, or rather drawing, used in the surveying field-book—namely, the representation of gates, fences, brooks, rocks, &c., all which may be practised in school prior to any lessons in the field. In order to induce the habit of representing objects, it would be well to exercise the pupils by requiring them to delineate some simple forms—such as the doors, windows, or desks of the school, and afterwards trees, rocks, fences, &c.

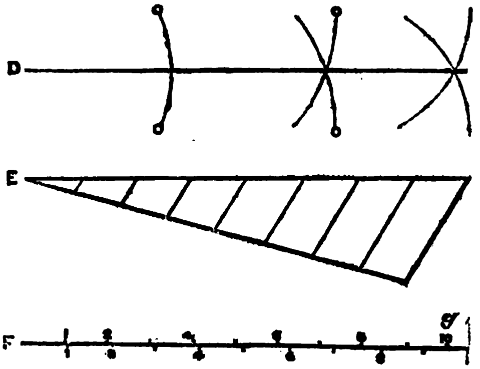
Every book of arithmetic commonly used in schools contains ample information on the departments of computation required. To add and subtract with facility is essential, and great accuracy is essential to the field operations of levelling; and in this, as well as in surveying, I have always preferred using decimal arithmetic—namely, by graduating the levelling-staff into feet and hundredths, instead of feet, inches, and tenths. It is by no means improbable that, ere the scholars of the present day arrive at manhood, the decimal system may be more generally adopted; and hence, it is well to lose no opportunity of exhibiting and explaining its great advantages over the ordinary methods of computation. How much more convenient is the operation of adding and subtracting feet and decimals, than the intermixture of twelfths and tenths of feet, inches and tenths. Again: in reducing chain dimensions to acres, roods, and perches, the great saving of time is abundantly obvious, and may very properly be explained to scholars generally as an illustration of the superior advantages of a decimal system. Thus, for instance, let any given length and breadth be expressed in so many thousand links, or hundredths of a chain, and either the same numbers or the equivalent lengths be expressed in feet, and reduced to the customary area of acres, roods, and perches. The vast saving of time and labour would thus become apparent, and a portion of the public would be thus led to contemplate with satisfaction a more extended use of so facile a mode of computation.

I have briefly indicated a few of the lessons in the reading, writing, and arithmetic of surveying; and I may here bestow a passing notice on the professions which appear in the public prints on the part of surveyors, who undertake in a few short lessons to impart a thorough knowledge of the art of surveying and levelling. The little learning thus to be acquired, if not a dangerous, is at all events a useless thing; and I have had many opportunities of observing how small a share of study had been bestowed upon the subject by persons professing to be competent to survey. Let me then earnestly impress on the attention of all who enter upon such tuition in schools, that it is far more important that a youth should be well grounded in the preliminary studies, rather than have a vague and indefinite notion of field measuring by following instructions of which he does not comprehend the principles, and which he would therefore be unable to apply to other cases.

It can scarcely be necessary to add, that among the indoor and preliminary studies of the young surveyor, an acquaintance with the first elements of geometry and mensuration is indispensable; but this is so evidently implied in the very nature of the occupation, that I shall only in this paper allude to such matters connected therewith as admit of some practical illustration not usually found in books. The geometrical principles of surveying and levelling are indeed placed within the reach of every teacher and of every student; so much so that I consider it chiefly of importance to point out such considerations as are less prominent, but which have an immediate and practical bearing upon the study of the art as capable of being applied in the ordinary routine of teaching.

In theory, and in the usual mode of treating the subect of geometrical drawing, a straight line is assumed as being readily attainable, whereas strictly speaking it is in practice very rarely accomplished, except on a very small scale. A circular arc is much more readily drawn with accuracy than a straight line; few rulers are perfectly straight, as may be observed by drawing a line and then reversing the ruler, when it will be found that almost every ruler is either convex, concave, or irregular. Another mode of testing the accuracy of a straight line, or even of drawing a very long line by means of only a short ruler, is shown in Fig. 5, D, by which process it is obvious that a line of indefinite length may be made as perfectly straight as the imperfection of all such operations by hand will admit. Few things appear more simple as a geometrical exercise than to construct a square of 18 or 20 inches on drawing paper; yet such is the amount of inevitable imperfection in the manipulation that it is a work of extreme difficulty, and the attempt to accomplish it may sometimes prove a salutary lesson as to the difference between the creation of an idea in the mind, and the following it out in practice. Nay, even the very contraction or expansion of the paper during the process of drawing will suffice to disturb the accuracy at which in theory we aim; and it is well that the mind of every student be impressed with these difficulties, if it were only to show the greater necessity for care in endeavouring to accomplish all that is practically attainable.

Fig. 5.



Next to the delineation of straight lines, the division of them is an operation frequently required; and here again the circle admits of easier and more correct division than a straight line of any given length, inasmuch as the radius is at once the measure of one-sixth of the circumference. A ready mode of dividing a straight line into any number of equal or unequal parts is to set them off by any scale which approximates to the given length, and transfer the several divisions to the said line by drawing lines parallel with the two extreme points, (as shown in Fig. 5, E.) In practice, I have found that if a line, (Fig. 5, F) is required to be divided into say ten parts, the eye can readily make a near approximation, and running over the line with the compasses at a guess, the distance *g h*, remains; the compass-point is extended over one-tenth of this space, and one, or at most two trials are usually sufficient to arrive at accuracy. This, though by no means the most geometrical mode, is nevertheless one which I have always found convenient in practice; it depends of course upon the accuracy with which the eye can estimate distance; but this is precisely the reason which induces me to name it, inasmuch as it is the more adapted for that continued practice which is easily attainable at school, and by which a facility of measurement is gradually increased.

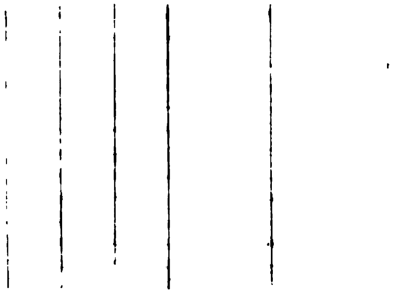
The measurement of crooked lines is frequently required in surveying and in estimating distances on plans, and is in most cases best performed by adding each additional length to the span of the compasses placed in the direction of such additional line. Simple as this method may appear in practice (and it is much more readily exhibited than described in writing), it was found on one occasion to have the attraction of novelty to one of the most eminent mathematicians of the present age; a circumstance which forms an ample apology for my introducing, even in the presence of the best informed teachers, details which at first sight may appear insignificant or superfluous. Indeed, I am satisfied that there is no greater barrier to progress than the neglect of the numerous little details which, after all, form a considerable part of the operations of surveying, or of any other art. They form, in fact, the small coin which is daily and hourly needed. Greater operations involving more extended principles come less frequently into play. I have given a few examples of studies which may be followed in the school previously to field practice, and the experience of the teacher will suggest similar exercises derived from books or from observation of field practice. I have also kept in view such diagrams and modes of illustration as are within the scope of an ordinary village school, as no difficulty can exist in larger and more opulent Institutions; and it will be my endeavour to adhere to this consideration throughout the observations now submitted to your Society.

I will therefore suppose a teacher with a class, say of six students, about to enter upon the field operations of surveying. They are about to begin a survey. What instruments and apparatus are now requisite? These I will endeavour to describe.

1st. The chain, which is so well known as to need no description in this place. It coincides in length with one side of a square, whose area is one-tenth of an acre: consequently 10 chains in length by 1 chain in breadth form an acre. Its length is 22 yards, or 66 feet; and its divisions, being 100 in number, are 7·92 inches each in length. Hence the facility of computation already alluded to, inasmuch as exactly 100,000 square links are contained in an acre; therefore when links are multiplied into links, it is only necessary to point off 5 places of decimals to reduce the product to acres. It is requisite to keep in view that any error in the length of the chain must occasion erroneous measurement throughout the entire survey; it is therefore proper to have it tested from time to time, which is best done by having marks cut on a flagged, level pathway, which, if near the school, may also be used for the scholars to accustom themselves to what is called "pacing," that is measuring by footsteps 20 paces to the chain, each pace being 5 links, or by 22 paces of a yard each. The chain pins are best marked by strong red tape, and the offset-staff, 10 links long, should have the 10 divisions marked by painted lines—not by nails drawn in, or by incisions, either of which weaken the staff so much as to be a frequent cause of breakage.

2nd. The Field-book. The form in which the measurements taken in the field are recorded is an important feature in surveying operations, and various methods are recommended by different writers. That which I have now to recommend to your attention has never, that I am aware of, been published; but it possesses advantages which are apparent on inspection. In Nesbit's "Surveying," and numerous other works of a similar character, the middle column, which contains the chain-lengths of the main line, is considered as representing the course of the chain, and the objects—as fences, houses, rivulets, &c.—are drawn on each side; and if any of these objects cross the line, then the lines representing such objects are continued across the column. In the form represented in Fig. 6, the course of the

*Fig.* 6.



chain is represented by a single line which enables the surveyor to delineate the several objects much more correctly. I can say from long experience, and not narrow opportunities of observing a great variety of forms, that I have never met with any form better calculated for making an easy record in the field, and presenting at any future time an easy index to the objects represented on each side of, or crossing the single line. The manner of using the several columns will be explained when describing the operations in the field.

Small wooden pegs are useful, and tickets of strong paper or card-board, to mark the number and position of principal stations. It is also desirable to have at least half a dozen small flags; to these must be added a tape-line, pencils, penknife, and India-rubber, which complete the apparatus required for chain-surveying. I may here observe, that estate surveys of great extent are capable of being executed wholly by chain-measuring, without the aid of the theodolite or dial; but wherever the practice of surveying is taught in schools to any considerable extent, it is desirable that either a circumferentor or theodolite should be occasionally used. With the exception of this costly addition, the outlay necessary to furnish a class of six pupils with proper materials to survey an estate need not exceed from 25*s.* to 30*s.* A tolerable proficiency in the use of the chain alone and its simple accompaniments, would probably in most country places enable an active teacher, with a few industrious lads, to make some survey of lands of sufficient value to gain such remuneration as would provide the class with a circumferentor, or even with a theodolite.

(*To be continued.*)

# THE PROPOSED NATIONAL INSTITUTIONS AT KENSINGTON.

The following paper has been submitted to His Royal Highness Prince Albert, as President of the Royal Commissioners for the Exhibition of 1851, by Mr. Henry Cole, C.B. It will be seen that Mr. Cole contends that the comprehensive proposals made in the Second Report of the Royal Commissioners for aiding the establishment of Institutions to promote Science and Art at Kensington, would be most effectively carried out by the public themselves, rather than by Government. Mr. Cole proposes to abstain from discussing the subject in its further details, or of pointing out the means of engaging private enterprise in their accomplishment, until the principle of executing the Commissioners' plans, not through Government, but by the public themselves, shall be admitted:

1. If the plans for promoting Science and the Arts, proposed by the Commissioners of the Exhibition of 1851, including the formation of an Historical Gallery of Painting and Sculpture, are to be carried out in the spirit of the event which originated them, and to be commensurate with the present intelligence and wealth of the country, not only a very liberal expenditure will be necessary, but large discretionary powers of action, to be exercised uncontrolled for a time, must be confided to a body to be especially devoted to the object. In order to insure the highest responsibility and unity of action in the management, it is advisable that it should consist, if possible, of only one person, or at most three persons. But it may be reasonably doubted if the public at large, the House of Commons as its representative, the Executive Government, and the several administrative departments, which it is proposed should be connected with the plans, will agree to confer the extensive powers requisite for success, or will trust any one person or small Commission with what may be considered an unlimited control over the very large expenditure of public funds which ought to be guaranteed at the beginning of the work, and would be so guaranteed if the plans were carried out by private enterprise.

2. There are palpable reasons, having a broad application, in the present times, why the action of any executive body appointed by Government for the application and expenditure of public money is usually much less prudent and less bold than any Corporation expending the capital which belongs to itself. Money that is paid from the public treasury is the property, as it were, of the *people generally*; and each individual, at all interested in the work to be undertaken, considers that, as a contributor to the funds to be spent, he *has a right* to give his opinion on the mode in which they ought to be employed. The managing body, therefore, is overwhelmed with suggestions as to the manner in which the duties which have been committed to them are to be performed. They become vacillating in the exercise of their functions under so extended a supervision and criticism; the suggestions and opinions promulgated are advocated by different parties, and, after probably much debate and mutual recrimination, one party obtains a majority, and proceeds to act upon this victory. But the conquering party has become timid, and fearful of increasing the rancour of the opposition by acting firmly and decisively in the direction they had advocated; whilst the defeated section are induced, if only in justification of their own opposition, to detect constant faults in the execution of the plan against which they have contended: they vilify and degrade as much as possible their victorious opponents, and the large mass of those who rarely think for themselves, and are not qualified to form any opinion of their own, either become altogether indifferent on the subject or join with the malcontents, and do all in their power to thwart the action of what they have been taught to believe to be an incompetent and ill-judging body. On the contrary, with a Corporation spending their own money, the public feel that they have no right to interfere. The capital belongs to them; they will profit by success; they are

in peril by failure; and the same personal interest and responsibility which give spirit and energy to the management prevent the interference of others, who feel that, as they have no stake, so they can have no plea for interfering with the progress of the undertaking.

3. That energy of action which could be exerted by a body having at their disposal an immense capital, already subscribed for and available at any time by successive calls, becomes impossible under any commission which is constrained to make timid advances, having to apply to Parliament for one vote after another, always desirous of bringing their estimates within the smallest possible compass, and always liable, by a different attendance on a particular day in the House of Commons, to have their whole proceedings stopped by an adverse vote.

4. From the circumstances already described; as well as from divided, and therefore imperfect, responsibility; from exemption from penalties in case of failure in the managing body itself; from want of power, want of confidence, and other circumstances inherent in the working of the English Constitution; the conviction has gradually become very general, that Government administration is greatly inferior to that conducted by private enterprise. The Marquis of Lansdowne, among other statesmen, has expressed forcibly this view. In 1847 he said, "It is universally admitted that Government are the worst of cultivators, the worst of manufacturers, and the worst of traders." All evidence, also, proves that Governments do not succeed as builders or managers of Institutions, administrative or educational. It may be said, without contradiction, that hardly a single important structure has been erected by Government within the last fifty years, which, after a very short experience of it, has not been proved to be defective.

5. The administration of our Government Institutions, especially those under *boards*, is constantly suspected and undergoing inquiry. The Customs, the Stamps and Taxes, the Excise, the Admiralty, the Exchequer, Ecclesiastical Commission, the Public Records, the National Gallery (three inquiries in as many years), the British Museum (twice in a few years), the Schools of Design, have all been examined into lately by Committees or Commissions, and several by both.

6. The transitional state of our Governments, and their relations to the House of Commons, also appear to be one of the causes of the failure of Government undertakings compared with those of private agencies. But it should be borne in mind, that it has always been characteristic of the people of this country to carry into effect their own desires themselves, rather than to be indebted to any central Government. Even when monarchy was strongest it was so. Our cathedrals and ancient churches, our universities and public schools, cannot be said to have originated in any central Government. So, in modern times, as different wants have arisen, our roads and bridges, docks, canals, streets, systems of lighting, railways, ocean navigation, &c., have not been produced by Government, but by the people for themselves. The administration of popular Institutions is not free from defects, but they are much fewer and less serious than in Government Institutions; and, when faulty, the remedy is more instantaneous, and readily submitted to. Government administration is slow and timid, whilst popular administration is rapid and prompt and bold. No Government would have ventured to start express trains at sixty miles an hour, as Lord Granville has well remarked. Government shrinks from giving the public information, and even its good intentions are often frustrated for want of it. The metropolis lost a beautiful flower-garden at the west end of St. James's Park, because no candid explanation of the plan was afforded. Government declines taking the initiative, always following rather than leading public opinion. Successive Governments declined to undertake a National Exhibition of Industry, and would probably do so again; and at no time did the Government give much countenance or help to the Exhibition of 1851. When private Institutions for promoting Science and Art come into comparison with Government Institutions, the latter always suffer by it. In illustration, the Zoological Gardens may be contrasted with the late Royal Menagerie in the Tower. The want of unity of action is signally shown in the New Houses of Parliament.

7. The preceding instances are sufficient to contrast the value of self-supporting Institutions with those of the undertakings of Government, which are supported by grants from public funds. The very appellation of "self-supporting" asserts the necessity of energy and exertion for the security of existence; and the decline of public patronage, which immediately follows faults of management, enforces a watchfulness and a readiness to correct errors, which a Government Board would avoid as a confession of previous faulty administration.

8. It is also characteristic of the people of this country, that they do not so much value anything to be obtained gratuitously as that of which they have to mark their approval by being ready to pay for it.

9. Another growing feeling which opposes any undertaking of a very grand and comprehensive character being satisfactorily carried out under Government management, and by the expenditure of public money, is the increasing dislike of the large provincial towns to the monopoly in London of great institutions to be paid for by money collected by the general taxation of the country. The feeling is growing rapidly, that such great works should be executed where they are called for, and be paid for by those who desire to use them.

10. Looking, therefore, to the assumed right of everybody to interfere, and the exercise of such right; to the insufficient knowledge of the principal controlling body in Government works, the House of Commons, especially on subjects of Science and Art, and its consequent diversity of opinion; to its imperfect sense of the means of insuring responsibility; to its want of confidence in the Executive Government, and its frequent usurpations of Government functions; to its capricious fits of parsimony and extravagance; looking, also, to the submission of the Executive Government to the House of Commons and its consequent weakness; considering how inadequately the Government is organised for undertaking new works, or even performing its current ordinary business; and, finally, seeing the want of co-operation between Government departments and their mutual jealousies, it seems hopeless to expect from the agency of Government a large and comprehensive execution of the Commissioners' plans – an execution worthy of being handed down to posterity as truly representing the feelings and energy of the people of this age.

11. It will be admitted that these plans ought to be realised with the same success as attended the Exhibition of 1851, and should not be less effective than the great works of the Crystal Palace, at Sydenham, that then the means of action must be as free and large as those which have produced the Exhibition and Crystal Palace.

12. The foregoing premises being conceded, it follows

that the execution of the Commissioners' plans would have the best chances of success, if carried out by private, and not Government, agency.

13. The plans involve the erection of spacious and attractive buildings (themselves developing the highest state of science and art), for the purpose of exhibiting collections, which should illustrate the progress of science and art; the formation of the collections themselves, and the execution of various extensive works, conducive to popular improvement and recreation. Besides, it is proposed to erect certain buildings for Government objects, such as the Department of Science and Art, and for any Institutions which may require them, such as the Royal Academy of Music, which has already applied for ground at Kensington for a building.

14. The Government and the Commissioners would have to lay down certain general conditions, defining whether the whole, or only a part of the plans, should be executed by private agency.

15. The following course of action might probably be arranged, and would seem calculated, on the one hand, to secure the advantages of responsible and unfettered action, and enlist the strongest motives to produce the highest excellence; whilst, on the other, it would enable the Government to adopt the result as a national work without incurring the risk of a failure. A charter should be granted to a public company, conferring the privileges of carrying out the erection of the buildings, and the decoration of them; the laying out the grounds with terraces, fountains, and sculpture, and the formation of certain collections, including all that ought to be comprehended in a National Gallery of Painting, Sculpture, and other decorative Arts. As respects the few paintings already national property, the Government might lend them, and agree to pay a fair rental for the space occupied by them. The company should be the sole judges of the scale of its expenditure and the execution of the works. When the structures and collections were sufficiently complete to be opened to the public, the Government, in return for its assistance, should have the right to determine whether the public should be admitted gratuitously or by payment. If it were determined gratuitously, then the whole works would be purchased for the nation at a fair valuation, upon principles previously settled. If the Government declined the purchase, then the public should be admitted on payment, so successfully tried at the Exhibition of 1851, and the company would undertake the future management, Government still reserving the right of purchase at the expiration of certain periods of time. The company might also contract to provide buildings for private Institutions. Space in the buildings might also be provided to exhibit the existing Government collections of sculpture, &c. under certain conditions; but these at present form a small part of what systematic collections of Art and Science would become by the energies of private enterprise, which would create galleries as extensive as those of the Louvre, as systematic as those at Berlin, and as rich in illustrations of the decorative arts as the Historical Collections in the Zwinger and Green Vaults at Dresden.

16. It does not appear necessary to prosecute the subject into further detail until the principle of proceeding by Government or private agency is determined. If private agency be employed, then it may be predicted that the Commissioners' plans would be realised with an expedition, economy, popular interest, and confidence, completeness and final success, far greater than could be hoped for under any Government administration in this country at the present time.

## HOME CORRESPONDENCE.

### CHEMISTRY AND PERFUMERY.

SIR,—The discussion about chemistry and perfumery in reality amounts to this: Mr. Septimus Piesse confines the term "perfumery" to such things as eau de Cologne, &c. Perfumed soaps, groceries, &c., he does not appear to class as "perfumery." Now, the artificial scents are, as yet, chiefly used for the latter substances; which in common language, and, I should say, in the perfumer's nomenclature also, would be included in "perfumery."

The authority for cow's urine being used for perfumery, is to be found in a little French work, called, I believe, "La Chimie de l'Odorat," in which a full description is given of the collection of fresh urine, and its application to this purpose. I need scarcely say, that it is the benzoic acid of the urine which is the odoriferous principle. Your obedient servant,

A PERFUMER.

### THE PAPER DUTY.

SIR,—If the consumption of paper may be taken as a criterion of the state of civilisation of a nation, and any further argument be necessary to induce the Chancellor of the Exchequer to repeal the paper duty at the earliest possible period, thereby helping forward the great work of education, the following extract from the *New York Tribune*, of Oct. 13th, may not be undeserving of serious consideration:

"Our improved methods of making paper have, however, been closely pressed upon by the immense and increasing consumption of the article. And nowhere is so much of it used as in the United States. In France, for example, with its 35,000,000 of inhabitants, only 70,000 tons of paper are produced yearly (of which one-seventh part is for exportation), giving only 4lbs. per head; and in England, for its 28,000,000, the production is 66,000 tons, giving 4½ lbs. per head; while in this country (America), the production may be calculated, although there are no precise documents, at very nearly the same amount as in England and France together, no part of it being exported, yielding for the 20,000,000 of free Americans very nearly 13½ lbs. per head as the yearly consumption. This can be accounted for only by our liberal institutions, the circulation of the journals, and the vast use of books in the common schools."

I am, Sir, yours very truly,

WAIMA.

### JUICE OF THE MUDDAR.

SIR,—In the Number of your Journal for August mention is made of an important communication from Dr. Riddell, of the Nizam's service, on the elastic gum obtained from the sap of the muddar, which he conceives might be employed as a substitute for gutta percha. Having published a notice on the subject in the *Bombay Times* eight or nine months since, on receiving specimens of the gum from Dr. Riddell, Sir Richmond Shakespeare, resident at Gwalior, set on foot some experiments of a more minute description than Dr. Riddell, with the view of ascertaining its electrical properties, when it turned out not to be a non-conductor at all; it conducted electricity as freely as a piece of untanned hide, and was therefore altogether unfitted for a coating to telegraph wires. We are not the less indebted to Dr. Riddell for his inquiries, and the muddar sap may serve some of the other uses of gutta percha where its electric properties are of no consequence. Many of its qualities are perfectly well known to the natives. In 1847 Major Ludlow sent me down some men from Rajputtana, to study European arts and manufactures at the School of Industry, then coming into existence under my charge, and amongst other things the use of the English turning lathe. The rats having eaten all our cat-guts, we were driven to the use of whip-cord for our lathes; and this again was continually annoying us by stretching and not recovering itself. One of my pupils remedied the difficulty by soaking the whip-chord in the milk of the muddar, thus converting it into an elastic string which no animal would meddle with; and he told me that in his own country it was employed for making leather and cloth waterproof, or bow-strings elastic. Subjoined is a list of the papers I have observed on the subject, taken from the second edition of my Index, now preparing for the press:

MUDDAR (*Calotropis gigantea or the Ak. C. Hamiltonii*)—On the manufacture of cloth and paper from the downy substance contained in the follices of Echmonkton, Journal of the Agricultural Society of India in 1849, page 51—On the Medical Properties of, Dr. Wallich on, Madras Literary Transactions, 1835, p. 278—On the Juice of, as a substitute for Gutta Percha, Dr. Riddell on, Transactions of the Agricultural Society of India, 1853, and Transactions of the Lahore Agricultural Society, 1852—Dr. Wight's Observations on, Madras Literary Journal, 1835—Playfair on, Calcutta Medical and Physical Directions, Vol. I.—Dr. Camin on, Edinburgh Medical Physical Journal, October 1827—Dr. Duncan on, *ibidem*, 1829.

I am, your obedient Servant,
GEORGE BUIST.

## PATENT LAW.

SIR,—I am anxious to call attention to the considerations which, in my opinion, after many years' practice, and having been in the thick of the late movement for patent reform, ought to form the ground for an equitable and reasonable patent law.

It will doubtless be admitted that nothing but inventions actually *new* (at all events, within this realm) and *useful*, should be allowed to be patented; and that such useful novelties being patented, the patent right should be kept as inviolate as may be.

To ensure that nothing but inventions actually new be patented is not altogether impracticable; to ensure that no patent shall be conceded for useless matters does appear to me to be impracticable. But to ensure inviolability to a great degree does appear tolerably easy.

The Patent Law Amendment Act did originally propose to secure that patents should be granted for novelties only, by requiring all applications for patents to undergo an examination by competent parties (not the law officers). This, however, was much objected to on the score of the difficulty it was feared would be found in obtaining competent parties, namely, persons of sufficient technical knowledge and yet having liberal ideas enough to deal fairly by inventors—views which the working of the American and Prussian examination systems render very plausible; its expensiveness, if properly done, was also a most pertinent objection. To help to ensure the inviolability of the patent the Act did make some provisions, such as facilitating the procuring of injunctions, &c., and requiring alleged infringers to state in detail their objections to the patent before the trial of any patent law suit.

Now, I propose, that after the application for a patent has been allowed, the applicant or his agent shall be permitted free access to the books and patent records without charge (the fee paid on application for a patent to be deemed sufficient), and if any museum or library be formed, which is desirable, free access thereto also.

That in giving notice to proceed he or his agent shall declare that after searching, he still believes himself to be the true and first inventor.

That instead of public opposition being repressed by reason of the entry of opposition or objections entailing, as it does, an expense of 2*l.* (exclusive of 3*l.* 10*s.*), payable for the hearing, the cost of such entry to be 5*s.* at the utmost, and that the Commissioners' Officer shall peruse the notice of objections; and if it show that the invention is already public or patented property he may officially oppose, but not to the exclusion of the objector if he likes to bear the expense; and if the objecter leaves the matter in the hands of the office, the 5*s.* may, at the discretion of the Commissioners, be returned.

That if the law officer decide against the patent being granted, the applicant may, nevertheless, appeal to the Lord Chancellor. At present the objector, if not satisfied, may so appeal, but not the unfortunate applicant.

That the patent being once sealed, shall be *primâ facie* evidence of patent right; that is, the whole onus of proving it bad shall rest on those who impeach its validity.

That no *scire facias*, or action to repeal letters patent, be commenced but by the Attorney or Solicitor-General, *ex officio*, and then not till after an inquiry made by proper examiners (to be attached to the Patent Office), at the expense of the Government. My reason for this is, that the Government having received payment for granting, or, so to speak, allotting a property to the inventor, and having professedly granted it, is bound to support it, or to satisfy the world that it has been obtained improperly of them, in which case they are bound forthwith to repudiate it. I do not, however, intend that the Attorney-General shall be bound to do more than advise with the examiners, leaving him to prosecute or not, at his own discretion. What I desire is, that the Government shall be left to deal with the annulling of the patent, as they may judge right for the public interests and justice, the public having, as now, the right to defend itself against any undue assumption of patent right, by pleading that it is an assumed and not a valid right.

I noted the remarks in a recent number of the JOURNAL, with regard to which I would say that I am quite sure that until we have somebody else besides law officials on the Patent Commission, we shall have little further amendment. It was this feeling that made me, during the progress of the Bill, suggest the adding of the President and Vice-President of the Board of Trade to it, their department being quite relevant to the subject of the Patent Laws. For myself, I am not one for giving the Commissioners any very great powers or duties, as my observation of the practical operation of such bodies has not tended to give me much confidence.

I am, Sir, obediently yours,
F. W. CAMPIN.

156, Strand, 24th October 1853.

## GRATUITOUS LECTURES.

SIR,—Your numerous readers have had placed under their notice lectures and lecturers, and several valuable suggestions respecting them. There is one other suggestion which, with your leave, I would beg to add. Of its worth the highly intelligent members of y

Society will judge. It is not intended to offer any general comparison between paid and unpaid lecturers, but to caution inexperienced office-bearers, in newly-formed Mechanics' Institutions, lest by indiscriminate acceptance of the services of gratuitous lecturers, they find themselves involved in pecuniary charges far greater than would have been incurred had professional lecturers been engaged.

"Experience is the scar of our wounds." Perhaps some may use my experience, and so escape hurt.

Some years ago a circumstance of an unusual character induced the sudden formation of a Mechanics' Institute in my neighbourhood. Socialism in its most undisguised form, and irreligion in its entire deformity, were openly introduced. Among other things, the young were invited to infidel lectures, frequently given on Sundays, and to public dancing on Sunday nights.

To oppose such appalling mischief, all parties combined. A Mechanics' Institute was formed; lectures, moral, literary, and scientific, were given; and a respectable library was formed.

It fell to my lot to be the treasurer of the newly-formed society, and hence my experience, offered gratuitously, that others may not purchase it for themselves.

Among the gentlemen offering to lecture without charge, was one who had recently taken the degree of M.D., and whose chemical attainments were reputedly, and I believe really, of a high order. His services were accepted. The young Institute had to purchase everything necessary, and many things unnecessary. In truth it seemed as though a laboratory had to be formed; and in the end it was found that the amount paid for two or three lectures on chemistry would have procured the delivery of entire courses on several subjects by the most experienced teachers.

The positive injury was first noticed in the diminished funds at the Society's disposal for its library. In this case, as in others, the lectures served to obtain members, but it is an increasing library which retains them. In these unfortunate lectures so much had been expended, that for a time the library had few additions, and the Institute lost its healthy action. This was never fully restored. Presents were made to the Institute by its office-bearers and other of its members; but as soon as Socialism had yielded to better influences, it ceased to possess the same interest, and to retain its supporters. Finally, it was wound up just in time to prevent loss to its members.

The record of my experience may be given in one short aphorism,—"*Beware* of gratuitous lecturers;" not by any means rejecting them altogether, but being very careful that they do not occasion unnecessary expense.

Yours, &c.

MERCATOR.

## PROCEEDINGS OF INSTITUTIONS.

BASINGSTOKE.—On Thursday evening, October 27th, a lecture was delivered at the Town-hall to the members of the Mechanics' Institute by John Haas, Esq., of Queenswood College, on "Fables," comprising the following syllabus; namely:—mythological fables—the Esopian fable; its origin, element, history, and development—tales—allegorical tales—perfect fables—allegory—introduction of animals as characters—the Seven Wise Masters—Zilpag—Jostran's fable—Esop—modern fabulists—drollery and humour of fables—animal poetry—sympathy for animals—objections—sarcasm—reasonings by illustration—use of the fable—fables that have played a part in history—political fables—fables with maxims, prudential and moral, as applied to practical life.

CRIEFF.—The Annual meeting of the members of the Mechanics' Institution was held on Thursday evening, October 27th. The chair was taken by the President of the Society, Dr. Gairdner, who called upon the Secretary to read the report of the Committee for the past year. The report stated the general satisfactory progress of the Institute, and that considerable advance had been made towards the realization of the desires of its founders. The three great features of the year were—the enlargement of the library; the formation of a museum, which had already been enriched by valuable contributions; and the union of the Institution with the Society of Arts. "This feature of the year," says the report, "is in some measure the most important of the three, not so much on account of present benefit as of future promise; for this Union of Institutions is a movement fraught with great results, and calculated to exercise a mighty influence on the literary and scientific training and education of our artizans, for whom these Institutions are mainly designed. . . . . . It may be asked, What benefit has this Institution received from this union? Your Committee are free to answer that the principal benefits are yet prospective. It is not to be expected in the nature of things that this infant union should accomplish in the two first years of its existence all it may be fairly expected to do. Its path is untrodden, and its duties are new; the opinions and desires of its component Institutions are various, and occasionally conflicting; and better far is it that we should labour slowly and patiently in concert, at the unseen but all-important foundation of the building, so that the majestic superstructure may rise gradually, fixed on a firm and tried basis, than that, like a glittering palace of fairy story, it should rise in a night and as quickly disappear." The report then enumerates some of the present benefits of union; namely, more than two guineas' worth of books and pamphlets received, the reciprocation of privileges, the prepared list of lecturers, the average reduction of forty per cent. upon the books of seventy publishers, the circulating collection of photographs, &c. The following office-bearers were chosen for the year 1853-54; namely,—President, Rev. W. Ramsay; Vice-President, M. B. Gairdner, M.D.; Treasurer, Mr. J. M'Intosh; Secretary, W. D. Fairless, M.D.; Curator of the Museum, Mr. J. Laurie; and the following gentlemen, in the room of the five retiring Committee-men, namely, Mr. Monteith (of Broich), Mr. John Knox, Mr. William Thompson, Mr. D. Dinnie, and Mr. J. M'Leish. It was announced that the Inaugural Address of the session would be delivered by the new President on the 10th of November.

DEPTFORD.—A lecture was delivered here on the 26th of October, to the members of the Institution, by Mr. Topham, on "Wordsworth." The singular self-reliance of the poet, his superiority to contemporary criticism, the feeling that possessed him that he was "dedicated" to a special work, the utility of his writings, and the lesson taught by his biography, were dwelt upon in a pleasing and impressive manner. Several characteristic and illustrative quotations were given, which, in a marked degree, associated Wordsworth with gentleness and spirituality.

HASTINGS.—The annual soirée of the Mechanics' Institution was held in the George-street Assembly-room, on Wednesday sennight. The chair was ably filled by G. Scrivens, Esq., President of the Institution, supported by the Rev. J. H. Fisk, the Rev. J. Stent, Mr. W. R. Selway, Mr. Galindo, Mr. G. P. Bacon, Mr.

Banks, Mr. J. Rock, jun., Mr. Putland, and Mr. Gutsell, The Secretary (Mr. Banks) read a report, which stated that the library now contained 1,439 volumes, and that during the last year 50 members, including 15 ladies, had been added to the list; making the total number 225. There were no classes at present in operation, but the Committee were very anxious to commence some, and would do so forthwith. After some remarks by the President and others, Mr. Banks exhibited some experiments in voltaic electricity, and the meeting separated.

**Lynn.**—At a meeting of the members of the Converzasione and Society of Arts held on Friday, the 24th of October, Mr. H. Solly, of London, gave a lecture entitled "A Voice from the Middle Ages"—a glance at the enthusiasm of bygone days, which was listened to with great attention, and presented a gratifying feature and result of the Union with the Society of Arts.

**Preston.**—The Twenty-fifth Annual Meeting of the Institution for the Diffusion of Knowledge was held on Tuesday, the 4th day of October; Mr. T. Walmsley, President, in the chair. Mr. John Burton, one of the Honorary Secretaries, having been called upon to read the report, stated that the number of members of all kinds amounted to 537. During the past year 150 volumes had been added to the library, by purchase, and 29 volumes by donation; of which 20 had been received from the Society of Arts. Besides these donations to the library, 67 silver coins had been presented to the Museum, all in fine preservation, and differing in date, device, legend, or mint mark. They were a portion of a treasure found on removing the storm-stricken thatch ot a cottage at Tenter-hill, Whittingham, in the early part of the present year; having probably been secreted there when Cromwell met and vanquished the Scotch army of Charles, "near Preston, in Lancashire," in August, 1648. Two prizes, of five and two guineas, respectively, were then awarded to Mr. J. H. Forshaw and Mr. T. Livesey for their Essays on the Mode of conducting the Classes in connection with the Institution.

**Reigate.**—The Mechanics' Institution has just held its sixteenth anniversary. The Committee, in transferring their trust, recommend to their successors in office the immediate establishment of classes, to repair the deficiencies of early education, and promote the further extension of knowledge. The library contains from 1,100 to 1,200 volumes, and consists of the best works on modern science and literature.

**Romford.**—The annual soirée of the Literary and Mechanics' Institution was held, on Monday week, at the Corn Exchange. The reading-rooms were filled with articles illustrative of the progress of science and art, and the walls were enriched with some good paintings. In the course of the evening, the Rev. Mr. Jones, the President, to whose zeal in the cause much of the success of the Institution and of the evening was owing, directed attention to the collection, pointing out some of the chief objects of interest; and the members of the Chelmsford Musical Class and the Romford Choir, diversified the entertainment. On Tuesday evening the rooms were again opened, when Mr. Edney delivered some of Lover's Irish songs; and the Rev. Mr. Jones urged the formation of a Museum, similar to that at Saffron Walden.

**Shrewsbury.**—On Monday, Oct. 24th, the twenty-eighth annual general meeting of the members of the Shropshire Mechanics' Institution was held in their large room, over the Market Hall, to receive a report of the proceedings of the past year; Thomas Pidduck, Esq., President, in the chair. The report was read, and adopted. Mr. William Phillips was elected president for the ensuing year. Messrs. Parry, Pidduck, Scoltock, Stuttle, Mallard, and Phillips were elected committee-men, to fill up the places of those who retire. Messrs. William Brightwell and J. E. Smith were appointed auditors. Mr. Edward H. Hudson was elected honorary secretary in the place of Mr. William P. Scoltock, who resigned. Votes of thanks were unanimously accorded to the retiring officers, and especial reference was made to the services rendered to the Society by Mr. William P Scoltock during the ten years he had occupied the office of secretary to the Institution.

**Uxbridge.**—The eighth annual meeting of the Literary and Mutual Improvement Society was held in the Public Rooms on Tuesday, the 18th ult., Harry Chester, Esq., of Highgate, in the chair. Mr. Hutson, the late Secretary, read the report, which stated that the present position of the Society was most encouraging, and that the removal to the Public Rooms had caused an increase of about thirty members. Numerous Lectures had been delivered during the season, and about 100 volumes had been added to the Library during the year by donation and purchase. The Society was not in debt. The Chairman then gave an address of an exceedingly interesting and valuable character, containing many practical suggestions on the subject of classes, of lectures, and of the conduct of such Institutions generally, eulogising the Committee for the general management of this Institution. He also suggested the possibility of extending the benefits of such Institutions, by bringing before the people subjects connected with government, public health, &c., &c. The Rev. C. P. Price then, in a short speech, expressed his good wishes for the prosperity of the Society, and spoke generally of the usefulness of such Institutions. The Rev. J. Glendening made some remarks on the mental and social benefits to be derived from the culture of the human mind. Mr. Jos. Hun- then addressed the meeting more especially with reference to the claims of the Institution on the town and neighbourhood, urging all to help to render it more efficient and to extend its influence.

**Welshpool.**—On Monday evening, 17th Oct., Mr W. Hughes, F.R.G.S., delivered a lecture to the members and friends of the Reading Society, on "Australia: the El Dorado of the Nineteenth Century," which gave great satisfaction, and was listened to with marked attention throughout. The chair was taken by the Venerable Archdeacon Clive, President of the Society

**Windsor.**—On Wednesday, the 5th ult., the Rev. Edward Hale, B.A., of Eton College, delivered the introductory Lecture to the members of the Windsor and Eton Literary, Scientific, and Mechanics' Institution on "The Rise of German Literature." The lecturer gave a very graphic sketch of the rise of the national literature in the reign of Charlemagne, tracing its progress as far as the seventeenth century, and illustrating his subject by appropriate quotations from various German bards, minnesingers, philosophers, and divines; at the same time rendering it amusing by a happy admixture of anecdote. On Wednesday evening, the 12th ult., the second lecture of the session, on "The Sense of Hearing," was delivered by Mr. W. Rayner, of Uxbridge. The diagrams were excellent, and the lecturer's style was forcible.

## TO CORRESPONDENTS.

*To Members.*—The Secretary particularly requests that he may be informed of any irregularities in the delivery of the Journal, which should be delivered free of charge, as not later than Saturday. In order to avoid mistakes, Members will have the goodness to inform the Secretary from time to time of any change of address.

## MEETINGS FOR THE ENSUING WEEK.

**Mon.** Entomological, 8.
**Tues.** Syro-Egyptian, 7½.—1. Mr. T. Wright, "On the Mediæval Notices of the Cave of Machpelah." 2. Mr. S. Sharpe, "On the Comparative Ages of the Pyramids."
Civil Engineers, 8.
Zoological, 9.
Medical and Chirurgical, 8½.
**Wed.** Pharmaceutical, 8½.
Arch. Assoc., 8½.
Ethnological, 8½.
**Fri.** Astronomical, 8.
Philological, 8.
Arch. Assoc., 8.—Class of Design.
**Sat.** Royal Botanic, 3½.
Medical, 8.

## PATENT LAW AMENDMENT ACT, 1852.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 28th October, 1853.*

*Dated 16th June, 1853.*

1464. J. A. A. Dumoulin, Paris, and 16, Castle-street, Holborn—Instrument for measuring and tracing.

*Dated 1st August.*

1794. S. C. Lister, Manningham, Yorkshire—Machinery for washing wool and hair.

*Dated 20th August.*

1949. A. Cuninghame, Glasgow—Manufacture of alkalis.

*Dated 30th August.*

2026. C. Goodyear, Avenue-road, St. John's-wood—Waterproof fabrics.

*Dated 6th September.*

2054. A. Sommerville and C. Twigg, Birmingham—Penholders, improvement applicable to umbrellas, &c.

*Dated 1st October.*

2242. C. Coates, Sunnyside, Rawtenstall, Lancashire—Coupling-pipes, &c.
2244. E. Davies, Bradford—Carrier combs.
2246. J. Hendry, Glasgow—Ovens.
2248. S. Murland, Castlewellan, County Down—Linen yarn machinery.
2250. A. Drevelle, Halifax—Apparatus in connection with looms. (A communication.)
2252. W. Brown, Bradford—Apparatus for washing wool, &c.

*Dated 3rd October.*

2254. J. W. Baxter, Mistley, Essex—Ship-building.
2256. J. Coleman, 4, South street, Finsbury—Construction of compasses.
2258. W. H. Wilding, Chesterfield-street—Propelling machinery.
2260. W. Crofts, Derby-terrace, Nottingham-park—Weaving.

*Dated 4th October.*

2264. J. Norton, Cork—Firing explosive compounds.
2266. J. T. Dodge, St. Austell, Cornwall—Rigging and working sails of yachts, ships, &c.
2268. D. T. Shears, Bankside, Southwark—Brewing.
2270. J. L. Norton, Ludgate-hill—Measuring and indicating distances travelled by carriages.

*Dated 5th October.*

2274. J. T. Wilson, Falkirk, N.B.—Alum.
2280. W. L. Tizard, Aldgate—Thermometers.

*Dated 6th October.*

2282. J. Schönemann, 89, Great Portland-street—Weighing-machines. (A communication.)
2286. A. E. Hargrove, York, and R. Richardson, Hartlepool—Printing machinery.
2288. W. Geeves, Caledonian Mills, Caledonian-road, Middlesex—Brick manufacture.

*Dated 7th October.*

2292. W. Ellis, Sheffield—Manufacture and ornamenting china, &c.
2294. J. Ferguson and J. Lillie, Glasgow—Improvements in trousers, &c.
2296. J. Porter, Salford Screw-bolt Works—Drilling and boring-machines.
2298. W. J. Matthias and T. Bailey, Seckforde-street, Clerkenwell—Obtaining power.
2300. R. J. Corlett—Scutching-machinery. (A communication.)

*Dated 8th October.*

2302. A. E. D. K. Archer, 1, Wharf-road, City-road—Apparatus for applying metallic capsules.
2304. H. Kraut, Zurich—Stand for casks.
2306. H. Dubs, Vulcan Foundry, Warrington, Lancashire—Manufacture of wheels, and furnaces for same.
2308. G. L. Smartt, Enfield—Preserving leeches and fish alive.
2310. H. R. Plimpton and J. L. Plimpton, Massachusetts—Furniture for bedstead, &c.
2312. H. Clayton, Atlas Works, Upper Park-place, Dorset-square—Brick and tile manufacture.

*Dated 10th October.*

2314. R. J. Maryon, 87, York-road, Lambeth—Anchors.
2316. G. F. Wilson, Belmont, Vauxhall—Treatment of wool and woollen fabrics.
2318. G. F. Wilson, Belmont, Vauxhall—Soap.
2320. R. A. Brooman, 166, Fleet-street—Railway switches. (A communication.)

*Dated 11th October.*

2322. J. Knowles, Eagley Bank, Bolton-le-Moors, Lancashire—Regulating machinery.
2324. W. Wilkinson, Nottingham—Improvements in bands, belts, and straps.
2326. W. Beardmore, Deptford, and W. Rigby, Glasgow—Steam-engines.
2332. W. M. Campbell, Glasgow—Earthenware kilns.
2334. W. H. Muntz, Massachusetts—Paddle-wheels.
2336. J. F. Porter, Bessborough-street—Moulding bricks.

*Dated 12th October.*

2338. G. F. Goble, 15, Fish-street-hill—Apparatus for signalising and stopping railway trains.
2339. J. Morison and D. Hurn, Norton Folgate—Nose-bags.
2341. P. and A. Clark, Gate-street, Lincoln's-inn Fields—Revolving shutters.
2342. T. Smith, Lambeth—Making pipes.
2343. E. J. Maumené, Rheims, France—Products from lignite or wood coal.
2345. H. Mapple, Child's-hill, Hendon, and D. M. Mapple, 16, Sidney-street, City-road—Electric telegraphs.
2346. G. Bradley, Castleford, Yorkshire—Stoppers for bottles, and tools for making same.
2347. J. Higgins and T. S. Whitworth, Salford—Spinning machinery.
2348. C. S. Jackson, Cannon-street—Preserving seeds, &c.
2349. J. Gibson, Bloomfield-road, Paddington—Fixing tyre on railway-wheels.
2351. R. and C. J. Jones, Ipswich—Fire-arms.

*Dated 13th October.*

2352. H. W. Butterworth, Philadelphia—Supplemental reflux valve. (A communication.)
2353. W. M. Campbell, Glasgow—Earthenware kilns.
2354. R. Popple, Beverley, and H. Woodhead, Kingston-on-Hull—Slubbing, roving, &c., machinery.
2355. J. Elce, Manchester—Spinning machinery.
2356. W. Robinson, Manchester—Machinery for forging screw-bolts, &c.
2357. Sir J. L. Lillie, 4, South-street, Finsbury—Machinery for breaking stones.
2358. J. T. Way, Holles-street, Cavendish-square—Making and refining sugar.
2359. A. Pope, 81, Edgeware-road—Furnaces.
2360. J. Piper, Shoreditch—Apparatus for affixing adhesive stamps.
2361. C. L. A. Meinig, 103, Leadenhall-street—Galvanic batteries.
2362. T. Grahame, Hatton Hall, Wellingborough—Ship-building.

*Dated 14th October.*

2366. A. McLean and W. F. Rae, Edinburgh—Manufacture of aërated liquids.
2367. W. Ridgway, Hanley, Staffordshire—Ovens and kilns.
1368. M. A. Davy, Homerton, and A. Taylor, Islington—Mechanical application of brushes.
2369. W. Palmer, Brighton—Ventilating.
2370. W. E. Newton, 66, Chancery-lane—Wool-combing machinery. (A communication.)
2371. J. Farrell, Stangate, Surrey—Insulating wire.
2372. Hon. F. W. Cadogan—Telegraphic communication for armies.
2373. A. E. L. Bellford, 16, Castle-street, Holborn—Drying grain, &c.

*Dated 15th October.*

2374. R. Gill, Culcheth, Leigh, Lancashire—Weaving single and double fabrics.
2375. C. Coates, Sunnyside, Rawtenstall, Lancashire—Looms.
2376. F. S. Thomas, 17, Cornhill—Railway carriages.
2377. B. Price, Fieldgate-street, Whitechapel—Smoke-consuming.
2378. J. H. Johnson, 47, Lincoln's-inn Fields—Iron manufacture. (A communication.)
2379. B. Royle and W. E. Chell, Manchester—Treating silk waste.
2382. T. Woodcock, Barnsbury-road—Cutting, carving, &c., metallic and other surfaces.
2383. J. Peary, Salisbury-crescent—Preventing railway accidents.
2384. A. McDougall, Manchester—Obtaining fatty matters in making glue.
2386. G. Laurie, New York—Artificial teeth and gums. (A communication.)
2387. A. Applegarth, Dartford—Printing and embossing paper to prevent forgery.

*Dated 17th October.*

2388. G. F. Chantrell, Liverpool—Revivification of animal charcoal.
2390. J. M. Dunlop, Manchester—Pressing machinery.
2391. W. S. Low and J. Barnes, Rawtenstall, Lancashire—Improved weaving shuttle.
2392. C. Pass, Bedminster, Somersetshire—Refining copper.
2393. E. Jones, Palace-street, Pimlico—Steam-engine governors. (This is the same invention as that for which Letters Patent were granted to her late husband, 14th April last.)
2394. S. C. Lister, Bradford—Combing cotton or wool.
2395. J. P. De la Fons, Carlton-hill, St. John's-wood—Apparatus for measuring and indicating distances travelled by carriages.
2396. A. Applegarth, Dartford—Letter-press printing machinery.

*Dated 18th October.*

2398. G. Price, Wolverhampton—Communicating between guard and driver.
2399. J. L. Stocks, Limehouse Hole, Poplar—Ships' jack-stays.
2400. C. P. D'Azene, 35, Essex-street, Strand—Rendering sea-water fit for drinking and other purposes.
2401. A. D. Noel, Chancery-lane—Zinc white. (A communication.)
2402. J. H. Johnson, 47, Lincoln's-inn Fields — Supporting heavy bodies. (A communication.)
2403. C. Nicholson, 3, New Broad-street—Avoiding collisions on railways.
2405. I. Hartas, Wrelton Hall, Yorkshire—Machinery for cutting turnips, &c.

*Dated 19th October.*

2408. J. W. Child, Halifax, and R. Wilson, Low-moor Iron Works—Regulating motive-power in engines.
2409. J. Norton, Cork—Fire arms.
2410. W. Roy, senior, Cross Arthurlie, Renfrewshire—Printing textile fabrics.
2411. R. Shaw, Glasgow—Writing instruments.
2412. G. Collier, Halifax—Carpet manufacture.
2413. W. Little, Strand—Typographic printing.
2414. C. Barraclough, Halifax—Carpet manufacture.
2415. J. Barton, Robert-street, Hampstead—Fittings for stables.
2416. W. Watt, Glasgow—Preparation of flax, &c.
2417. T. Thompson, Muchpark-street, Coventry — Machinery for carpet-weaving, &c.
2418. A. Dussuc, 33, Grove-place, Brompton—Digging machine.
2419. W. Binns, Leeds—Treatment or finishing woollen fabrics.

*Dated 20th October.*

2424. J. B. Burney, Battersea—Smoke prevention.
2426. J. A. Roth, Philadelphia—Bleaching fibrous materials, &c.

### APPLICATIONS FOR PATENTS, WITH COMPLETE SPECIFICATIONS FILED.

2420. A. A. Beaumont, Paris, and 16, Castle-street, Holborn—Production of caloric with or without combustible material. (19th Oct., 1853.)
2440. F. A. Gatty, Accrington — Printing colours on textile fabrics. (21st Oct., 1853.)

## WEEKLY LIST OF PATENTS SEALED.

*Sealed 27th October*, 1853.

1012. Richard Howson, of Manchester — Improvements in weavers' harness. (A communication.)
1014. Joseph Walter Gale, of Woburn-place, Russell-square—Improvements in the permanent way of railways.
1020. James Andrew Bruce, of Coleraine — Improvements in the construction of hay-racks and other apparatus or apparatuses to contain fodder for horses and other cattle, and also in the method or methods of fastening horses, or other cattle, to prevent their overcastings.
1021. Thomas Culpin, of Greenwich—Improvements in steam-boilers and in the appendages thereto.
1028. Joseph Hetherington, of Manchester—Improvements in reels for reeling or winding yarn.
1035. William Armand Gilbee, of South-street, Finsbury — Improvements in apparatus for heating. (A communication.)
1041. Thomas Collins Banfield, of Queen-square, Westminster —Machinery for cutting or chopping roots, plants, or other similar substances. (A communication.)
1042. Thomas Collins Banfield, of Queen-square, Westminster —Drying and preserving vegetable or other saccharine plants. (A communication.)
1053. Weston Grimshaw, of Mosley, County Antrim, Ireland—Improvements in slubbing and roving frames, for preparing for spinning cotton, flax, and other fibrous substances.
1134. Edward Blackett Beaumont, of Wood Hall, Barnsley, Yorkshire—Improvements in the mode of constructing dwelling-houses or other buildings, and in peculiar shaped bricks and tiles to be used for the purpose.
1136. David Law, of Glasgow, and John Inglis, of the same place—Improvements in moulding or shaping metals.
1144. Thomas Murray, of Marygold, Berwick—Improvements in breaks or drags for wheeled carriages, and in adapting the carriages for the application and use of such breaks.
1191. George Coppock, of Heaton Norris — Improvements in looms for weaving.
1208. Thomas Richardson, of Newcastle-on-Tyne — Improvements in the manufacture of certain compounds containing phosphoric acid.
1214. Charles James Pownall, of Addison-road—Improvements in the preparation and treatment of flax and other similar vegetable fibres.
1235. Job Allen, of Bower-street—Improvements in communicating intelligence.
1256. John Blair, of Ducie-bridge Mill, Manchester—Application of steam power to the working of railway breaks.
1572. James Tatlow, of Wirksworth, and Henry Hodgkinson, of the same place—Improvements in small-ware looms.
1593. Richard Archibald Brooman, of Fleet-street—Improvements in impregnating, saturating, or coating threads, yarns, and fabrics with metal, which process the inventor terms "mechanical dyeing."
1761. John Giblett, of Trowbridge—Improvements in the manufacture of woollen cloth and other fabrics.
1812. John Slack, of Manchester—Improvements in reeds for looms.
1875. Thomas Frederick Newell, of Cloak-lane, Queen-street, Cheapside—Improvements in machinery for numbering the pages of books and documents. (A communication.)
1884. Richard Archibald Brooman, of Fleet-street—Improvements in the manufacture of fuel. (A communication.)
1886. Richard Archibald Brooman, of Fleet-street—A method of obtaining impressions from dies and other engraved and figured surfaces by stamping or pressure. (A communication.)
1907. Joseph Leon Talabot, of Paris, and John Davie Morries Stirling, of the Larches, near Birmingham—Improvements in the manufacture of cast steel.
1909. George Edward Dering, of Lockleys—Improvements in electric telegraphs.
1912. James Stewart, of St. Paul's-road, Camden-square—Improvements in pianofortes.
1929. Robert Clough, of Liverpool—Improvements in the construction of ships and other vessels.
1942. Charles Watt, of Selwood-place, Old Brompton, and Hugh Burgess, of Percy-street, Bedford-square—Improvements in disintegrating and pulping vegetable substances.
1991. John Davie Morries Stirling, of the Larches, near Birmingham—Improvements in the manufacture of rails and parts of railways, and tyres of railway wheels.
2011. James Picciotto, of Crosby-square — Improvements in burning and reburning animal charcoal. (A communication.)
2013. William Edward Newton, of Chancery-lane—Improved machinery for cleaning bran or other offal obtained during the manufacture of flour. (A communication.)
2021. William Edward Newton, of Chancery-lane—Improved machinery for making barrels and other casks. (A communication.)
2027. Robert Oxland, of Plymouth — Improvements in the manufacture of manure.

*Sealed 29th October.*

756. George Shaw, of Sheffield—Improvements in the manufacture of knives and forks.
1051. Barnabas Barrett, of Ipswich — Improvements in the treatment of natural and artificial stone, and of articles composed of porous cements or plaster, for the purpose of hardening and colouring the same.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Oct. 26 | 3522 | A Closet Pan | Stephen Green | Princes-street, Lambeth. |
| ,, 27 | 3523 | "Fiolet's Syphon Pipe" | Louis Maximalien Fiolet | 18, Wilson-street, Finsbury. |
| ,, ,, | 3524 | Bracelet, Page, or Garter-fastener | H. and R. Cumberland | 14, Coleman-street. |
| ,, ,, | 3525 | An Improved Pocket Companion | George Chambers and Co. | Russia-row, Cheapside. |
| ,, 28 | 3526 | Cylinder Ball Valve | Devey and Dale | 8 and 9, Shoe-lane. |
| ,, 31 | 3527 | Æolian Hat | Flanagan and Co. | York-chambers, Liverpool. |

# SOCIETY OF ARTS.

## FRIDAY, NOVEMBER 11th, 1853.

As the Session commences on Wednesday next, the present is thought the fitting period for closing the first volume of the JOURNAL, so that the new one may begin with the opening of the Session. With this Number a Title-page and Index is given, and Mr. Sopwith's valuable paper is concluded, instead of carrying it on to the next Volume. It is true that there will be but fifty-one numbers, but to have carried it on to a fifty-second number to make the year complete, would have involved the necessity of recording the opening proceedings of the coming Session in one volume, with the remainder of the Session in the next. It has been thought that it would be a more convenient arrangement to make each volume a complete record of each Session. The Members have now had one year's trial of the JOURNAL, and it is confidently believed that whatever doubts and fears for its success might have existed at the starting, the experience of the year has shown that there need be none now. It has supplied a want, and with success. In saying this, however, it must not be supposed that the Council are blind to its deficiencies or shortcomings,—they are well aware that it is not yet all they could wish, or what they trust it will become. The experience of the past year has shown what may be done, and affords good ground for anticipating a further success in the ensuing Session. Reliance was placed on the assistance and co-operation of the Members at large; and in this the Council did not miscalculate. To Messrs. Charley, Denison, Reveley, Sopwith, to "Cosmos," "Delta," "Waima," and others, who have aided by their contributions, thanks are especially due for the assistance they have given.

Fresh arrangements have been made for printing the JOURNAL in a somewhat enlarged form, with such alterations and improvements as the trial of the past year has suggested; and it is hoped the next year will show a marked improvement in every respect. In this, the Council have every confidence that the Members of the Society, and of the Institutions in Union generally, will, in their several specialities, give their active support in communicating to its pages such information and intelligence as they must constantly have at their command, so that the JOURNAL OF THE SOCIETY OF ARTS may become, as it should be, a complete record of Industrial progress.

## NOTICE TO INSTITUTIONS.

### BOOK ORDERS.

As the time is now approaching for the receipt of the book-orders, the Secretary to the Society of Arts would be particularly obliged by the different local Secretaries adhering strictly to the instructions given in the Circular, dated Oct. 13th, accompanying the table of the rates of discount to be allowed by the Publishers. It is obvious, that, unless one uniform plan is followed, there would be much confusion and unnecessary labour; and it is hoped that all parties will assist in making the arrangement as practically serviceable as possible.

### DESPATCHES OF THE DUKE OF WELLINGTON.

THE Council have much gratification in announcing that, pending their negotiations with the Publishers, they have received a communication from the Representative of the late Colonel Gurwood, offering to the Institutions in Union copies of the well-known "Despatches of the Duke of Wellington," published at eight guineas, in eight volumes, royal octavo, bound in cloth, for four guineas. The Council wish particularly to call attention to this favourable opportunity of obtaining on very liberal terms a work which, they presume to say, should be found in every public library. They will receive orders for the work, which should be accompanied by a Post-office order for four guineas, and will arrange for its prompt transmission.

## NOVEL APPLICATIONS OF WEAVING TO THE MANUFACTURE OF CARRIAGE LACE.

COMMUNICATED BY MESSRS. DART AND SON.

HAVING produced a very complicated and beautiful specimen of coach lace, for the Great Exhibition of 1851, by means of the Jacquard loom; and having since made a novel application of another known principle, called "Leases," which we have patented, specimens of which manufacture, together with a few ordinary patterns illustrative of the history of the trade, have been placed by us in your Exhibition this year; a few observations on these may not be uninteresting to the readers of the *Journal*.

The great advance which has been made in this art, enabling harmony of colouring to be combined with exquisite workmanship, will be apparent to any one who will take the trouble to compare our ancient and modern patterns—some manufactured thirty-five years ago, the other expressly for the late Exhibition.

We have endeavoured to illustrate the history of these thirty-five years,—the period during which nearly all the improvements have been made,—by weaving specimens of the various styles, and placing them in chronological order. The only branches of the art known prior to 1818, were those called, "All Raised," and "Tuft on Lay." The next in order of progress received the name of "Tissue." This process, though patented in this country, was imported from France, and we had the merit of causing Englishmen to turn their attention to the subject, and to bring their ingenuity to bear upon it. Novelties and improvements were soon produced, and the manufacture to which the names of "Drawn-in Warp," and "Three-binder Vellum," were given, very soon to a great extent superseded the patent. These in their turn have been superseded by others, which are called, "Cut on Terry," invented by Messrs. Cooper and Blackford, and by Caufoy; cheap and useful styles, but still wanting in that perfection which has since been attained.

In 1851, we exhibited in the Great Exhibition, patterns combining several novelties. In the first place the design of the figure, called by us the "Indian Bell," is new. Secondly; it is believed to be the longest, and most extensive ornamental figure ever woven in coach lace. Thirdly; it combines the different styles, figured ground, tissue, raised pile, cut on terry, and many colours. To have manufactured this pattern by "Leases," before the invention of "Tyres," or means to which we shall subsequently allude, by which the same "Leases" can be used over and over again, would have required more than a thousand "Leases," and a loom of almost unbounded magnitude.

In this instance, however, no Leases were used; but a loom, on the well-known principle of the "Jacquard," was adopted for the purpose.

The specimen exhibited in the Great Exhibition was produced from a Jacquard loom, and required three sets of cards in simultaneous operation. Since the Great Exhibition a further improvement has been brought out, and has been patented by us, and this relates to "Leases." The object is to weave in coach lace numbers and letters, so as to form words, and so to prepare the loom that many changes in the numbers or letters can be made during the process of weaving, without the necessity of altering the original preparation of the loom. This is effected with regard to letters by "mounting" the loom for the whole alphabet; and with regard to figures, by "mounting" for the nine digits and zero, in such manner that each letter and number is independent of the other—each being mounted in a separate "course;" and so that any letter or number is made to appear on drawing a string called a "Tyre." This principle enables us to apply weaving where embroidery has hitherto been used. For the police of towns, the servants of public companies, the officials on railways, &c., badges are produced by this means, good and neat in appearance, and superior to those hitherto made, both in durability and distinctness; and having the advantage, likewise, of considerable economy in price over those now produced by embroidery. There is one purpose to which the patent may be advantageously applied, viz., that of numbering the lace inside railway carriages. This, however desirable, could not be done before on account of the cost. Specimens, in which the name of the railway and a number is woven, will be found in the Society's Exhibition. Everybody knows that delay and confusion constantly occur from persons being unable to find their carriage, owing to their not knowing the number of it when they alight at stations. It is true that metal badges are sometimes attached to the inner side of the door; but persons sitting in the middle of the carriage will not probably observe it. If, however, this number were woven into every quarter of a yard of the lace with which the carriage is furnished—which would not increase the expense—it would rarely fail to be impressed on the passenger's memory. The invention is also applicable to army accoutrements; and a considerable saving might be made by the substitution of this process of weaving for embroidery in present use.

## CAMBAY STONES.

CAMBAY was celebrated for its cut stones above 2,000 years ago. They are mentioned by the author of the "Periplus" as onyxes, porcelain stones, or proably jaspers, dyed stones, &c. Uertomenes, in his account of Cambay, in 1503, mentions "A mountain where the onyx stone, commonly called the cornelian, is found, and not far from this another, where chalcedony and diamond, abound." Captain Hamilton, who visited Cambay in 1681, says, "The cornelian and agate stones are found in this river, and nowhere else in the world. Of cornelian they make stones for signets, and of agates, cabinets entire, except the lids. I have seen some fourteen or fifteen inches long, and eight or nine inches deep, valued at 40*l*. They also make bowls of some kinds of agates and spoons, and handles of swords, daggers, and knives, and buttons, and stone seats, and snuff-boxes of great value."* In Milburn's "Oriental Commerce" they are mentioned as forming extensive articles of purchase at the East India Company's sales, though for many years past scarcely any of them appear to have been sent to Europe; China, as will be seen by the table below, taking off the chief supplies. Two years ago considerable exports were made from Bombay of bloodstone, in its rough state; such large profits were obtained from the earlier cargoes, that the market was glutted almost immediately, and fine specimens, which used to sell at 3*s*. or 4*s*. a pound, are now to be had in the Bombay market, in abundance, at from 2*s*. to 3*s*. a cwt.; and 28 lbs. weight of them—some eight or ten inches long, and five or six inches thick—have been purchased for a couple of rupees. Were the native stone-cutters a little better instructed in the art, and taught to make up articles to meet English taste, there seems no reason to doubt but that the manufacture might very quickly be made a most extensive and lucrative one. The stones themselves abound in the country, and are to be had at the most insignificant prices; so are the corundum, and the lac employed in cutting them; and the expensive article of diamond dust, universally employed by lapidaries in this country, where it is of the utmost importance to avoid the expense of labour, is never thought of where this class of workmen are content with 10*s*. a month, for which they will turn out as much work as an Englishman at 4*l*. Lapidaries in England complain of the Cambay stones as being badly finished, and in this state unsaleable. This arises from the want of instruction of the native lapidaries, who, if taught, are quite capable of putting any amount of finish on them that may be desired.

The following Table, taken from the Bombay Custom-house returns, gives the value of the traffic in Cambay stones, which averages betwixt 10,000*l*. and 12,000*l*. annually, one per cent. of the stones finding their way to Europe. The reader should remember that one rupee is equal to two shillings, and that there are sixteen annas in a rupee:

VALUE OF EXPORTS OF CORNELIANS.

| | 1844. | 1845. |
|---|---|---|
| | Rupees. | Rupees. |
| China | 73,443 | 59,653 |
| Singapore | 5,352 | 645 |
| Arabian Gulf | 935 | 18,197 |
| Suez | — | 40 |
| Persian Gulf | 2,269 | 1,257 |
| Calcutta | 4,179 | 4,913 |
| Coromandel Coast | — | 315 |
| Malabar and Canara | 89 | — |
| Ceylon | 2,536 | 1,540 |
| Great Britain | 100 | 216 |
| Cutch | — | 28 |
| Kurrachee | — | 35 |
| Goa, &c. | 53 | — |
| Concan | 1,062 | — |
| Guzerat | 3,460 | 2,000 |
| Total rupees | 93,478 | 88,839 |

The chief articles into which they are wrought are—paper-weights, knife-handles, miniature-sized cups and saucers, tablets for snuff-boxes, sets of brooches, necklaces and bracelets, pins, buttons, and studs. A field-gun, with all its appointments, is one of the finest ornamental pieces of Cambay stone-work: they sell at from 40 to 5 rupees.

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* *Vide* Hamilton's "Account of the East Indies," 2 v. London, 1744.

## PRACTICAL OBSERVATIONS ON SURVEYING AND LEVELLING.

### BY THOMAS SOPWITH, F.R.S.

*(Continued from page 609.)*

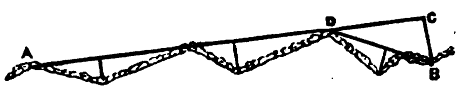
We are now arrived at the next step in the teacher's progress—the issuing forth to commence field operations; and here let me again mention with the respect I owe to his memory the obligation I feel for the service I derived from my schoolmaster, Mr. Henry Atkinson, having provided precisely the kind of instruction which I am now urging on the attention of this society. I well remember going with him to Elswick-fields, and acquiring I may say a perfect knowledge of the general principles of surveying. Mr. Atkinson was not one of those preceptors who confined his instructions to the school. When he explained the size and distance of the planets in the ordinary school lessons, he provided the telescope at his house in clear evenings, and added tenfold interest to the lessons he conveyed, by revealing to his delighted pupils the wonders which the telescope opens to the view. The microscope also was a means by which he impressed on the minds of his scholars a firm and devout conviction that Almighty goodness and Almighty skill prevail alike in the least as in the greatest of the works of Divine wisdom. It was in this manner that he laid the foundations of deep thought, and taught his grateful pupils *to feel* as well as *to know*. In like manner he brought the powers of an accomplished mathematician to bear upon the subject of surveying, and after fully explaining its general objects and method of procedure in the school, followed up these preliminary lessons by actual surveys, which enabled me not long after, and while yet a pupil in Mr. Atkinson's school, to measure the field in which Higham-place, in this town (Newcastle-on-Tyne), is built, for the purpose (and to which the plan I made was applied) of setting out the building-sites of that row of houses. And before leaving a reminiscence connected with the subject of this address, I may be permitted to mention, that the silver pencil-case I hold in my hand was given to me by a friend, for whom I made a plan at school, under the instructions not less kind than able, of this excellent teacher, from whom I received nearly the whole of my education.

The simplest forms of field-measuring may be conducted by two persons; three or four, however, are essential to any rapid progress being made. Six may very conveniently be included in one class, and rendered useful; but I do not recommend that more than that number should be employed conjunctively. The first essays may be made by the master and two pupils, who, after a few days' practice, would be able to proceed with, and impart instruction to other three or four boys. I will suppose a party of six assembled in a field—level, or nearly so. If a single field is to be measured, the requisite lines will, in most cases, present themselves to those who have read the first elements of geometry. If triangular, the merest tyro would understand that by measuring its three sides the materials are obtained for *delineating its exact form*, and ascertaining *its precise contents*. If nearly square, or rectangular, the measurement of its sides and of a diagonal line, effect the same results, inasmuch as two triangles are thus obtained. It is by simple examples and easy conditions, such as these, that young minds are brought to *comprehend* (what a world of meaning is contained in that word) the principles on which more intricate and elaborate works are to proceed; and without a clear recognition of the *reason why* each operation is performed, all solid progress is hopeless.

If the field is of irregular form, the students are to be exercised in devising what number and direction of lines will most readily furnish the two objects required; viz., the means of delineation and admeasurement,—an exercise which may at times be practised in the school, by giving the pupils imaginary forms of irregularly-shaped fields to be filled in with suitable side lines and diagonals. And here the difference between theory and practice soon becomes apparent. I have known pupils taught to measure an offset of some eight or ten feet by setting off a perpendicular from the main line, whereas very little practice will suffice to take offsets of ten times that length by judging of the perpendicular by the eye. The cross-staff recommended in some works for that purpose is therefore in general practice useless, although as explaining a principle it tends to impress the object aimed at more forcibly on the mind. It is not easy to *teach* approximations, or to explain to the uninitiated what skill and practice only can attain,—a small cross-staff, such as may be made by a common carpenter, suffices to exhibit the principle. A young scholar is thus taught that the offset is to be measured from a given point in the main line where the cross staff is placed, to some definite object,—as a tree, a gate, or part of a fence—such line being exactly square, or forming an angle of 90° with the main line. Here is a clear, definite, distinct work to be done, and the means of doing it; a very little practice will supersede the use of the cross staff, but the pupil will ever remember that the eye is required to supply its place—not by attempting an indefinite approximation, but by the fulfilment of an exact and well-defined duty.

In selecting lines to be measured with the chain, the following considerations constantly come into practical use: viz., 1st. That it is desirable to make the first line as long as the place to be surveyed admits, in order that it may form a convenient base for the further lines to be connected with; and this is to be aimed at regardless of whether such line passes near the fences, roads, or other objects. In a triangular piece of ground the longest side would form a proper base, and also afford the means of measuring the adjacent fences. In a square-shaped piece of land or parallelogram, the diagonal being first measured forms a base for two triangles upon it, and in a large and irregular estate a line is to be selected stretching through its greatest extent. 2ndly. The other lines are, generally speaking, to be set out with reference to two points; viz., to be as near to hedges or other objects as practicable, having regard also to facility of measurement; and the judgment of the surveyor is called into exercise very frequently to decide between these two conditions. In measuring along a crooked fence, for instance, the line, A B, (fig. 7,) is the nearest average distance from the fence to be measured, but it involves no less than five crossings of the fence; and at each of these there is not only the difficulty of straightening the chain,—that is, extending it truly so as to be a correct measure of length,—but there is often a difficulty in seeing the general direction of the line;—add to this

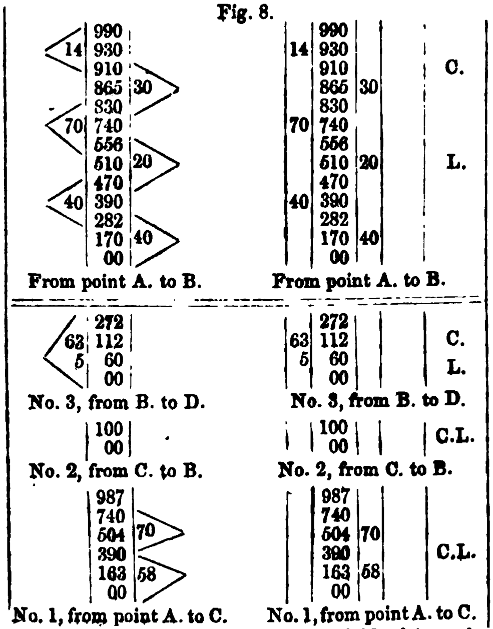
Fig. 7.



the loss of time occasioned by the assistants' having to climb over or to creep through, or go to some distance; and it is apparent that these impediments far more than counterbalance the theoretical value of proximity. In the lower figure a line, A D, continued to C, is measured without interruption, as are also the lines C B, and B D. In the upper figure, then, we have on the line A B, five crossing-places if that line is adopted, and the angles marked 6, 7, 8, 9, 10, 11, 12, 13, require notice in the field-book. I take these examples, to show the manner in which the entries would be made in both cases, not only in the form commonly adopted, but also in that which, though not so well known, or so generally used, is yet I think decidedly the best.

The following Fig. 8, being the respective field-books; in the right hand form, the line marked C L is that which represents the course of the chain, or chain line, and though the type does not admit of the sketch itself being shown, it is easy to perceive that a very near resemblance to a correct drawing may be made, the same as in the upper and lower plans of Fig. 7, on the lines A B, A C, &c.

Fig. 8.



From point A. to B. From point A. to B.

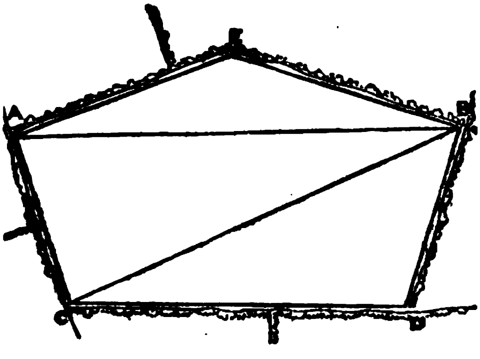
No. 3, from B. to D. No. 3, from B. to D.

No. 2, from C. to B. No. 2, from C. to B.

No. 1, from point A. to C. No. 1, from point A. to C.

The following Fig. 9, represents a field of irregular shape. The line, A B, is measured without any offsets being taken; B C, and C A, with C D, and D B, complete the trapezium, and A E, and E B, enable the surveyor to take convenient measurements to the irregular fences indicated by these letters.

Fig. 9.



I have taken these simple examples, in order to point out the first operations in field surveying; viz., the selection of lines in order to throw the ground into geometrical forms. And here is a practical consideration connected with the subject as regards schools; viz., that as no great portion of the teacher's time can be devoted to so small a minority of his scholars as a surveying class, it is desirable that the principles and practice should be explained as fully as possible in the school. This selection of lines, and arrangement of geometrical forms, may readily be explained by means of figures drawn on that indispensable aid of every teacher,—the black drawing-board; and, habituated to such instructions, the elder pupils may be enabled to shape their course in the field, and exhibit the accuracy of their work to the schoolmaster, without the necessity of taking him from the rest of the scholars, except only at occasional and brief opportunities, as for instance, on summer evenings or holidays, when it is not unlikely that many younger pupils may have acquired some curiosity on the subject, and so become spectators of the survey.

It would render this paper much too prolix were I to enter upon a description of all the lesser details which occur in the practical operations of measuring land; nor are they, generally speaking, such as require to be pointed out to the intelligence and activity of a superior class of pupils, and still less to the well-informed and respectable body of teachers, who have shown their great regard for the dignity of their calling and the extension of their usefulness by considering the cultivation of science and the diffusion of knowledge from a uniform source of information; as in the case of lectures, or papers, like the present. It will rather be my aim to condense such matters, well knowing that minor details are best left to individual judgment and experience. In first commencing field surveys with a party of scholars, I will therefore put, in as brief a form as I can, some of the considerations which are to be kept in view in a class of six pupils.

1. The parties in the survey are to have their respective duties assigned. The teacher, when present, is to see that *all* perform their several parts; he is the observer and adviser—the entire operations are to be begun, continued, and ended by the pupils.

2. To one is assigned the position of conductor, or manager, whose instructions the rest are to obey. He takes the field-book, directs what lines are to be measured, and upon him rests the responsibility of accuracy in all the operations; other two take the chain, the one acting as the leader, pulls forward the chain; the other called the follower, carries the other end; the fourth takes the offset-staff (which, in practical surveying or in a small class, may be done by the conductor), and measures offsets, occasionally assisted by one of the others in measuring buildings with a tape-line; and the fifth and sixth carry the flags, set them in straight lines, as desired by the conductor; and, in extensive surveys this "setting out" of lines affords ample employment for two assistants.

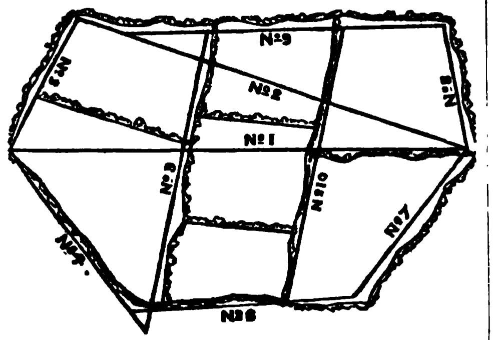
3. The conductor will ascertain that the chain is of correct length before commencing the survey.

4. The greatest care is requisite on the part of the chain-bearers that the chain is exactly upon the required line—that it is fully stretched out—that there be no yielding or movement from the place of commencing each chain length; that no crooks, nor doublings up nor bendings have happened, and to change the pins at every eleventh pin; when the follower, allowing the

chain to be on the ground, walks up to the leader with ten pins or arrows, which he counts over to him, and sees one arrow put in the ground.

In the following Fig. 10 are represented seven fields of irregular shape, and it will only be necessary to inspect the lines representing the course of the chain in the order in which they are numbered, to understand the manner in which the whole area is embraced in a series of triangles.

Fig. 10.



The main line, No. 1, is taken in the direction of the greatest length of the estate, and the distances at which the several hedges are intersected are carefully marked. Small pegs, or a ticket placed under a stone, are also noted in the field-book, in order that any future connection of other lines may be easily ascertained. Whilst the conductor and his assistants are measuring the line No. 1, the flag-bearers select a point under the general instruction of the conductor at which the line No. 2 terminates, and No. 3 commences, so that a great triangle is thus formed. Nos. 4 and 5 complete a second triangle. No. 5 ending on the line No. 1, either close to some mark which the conductor has left in contemplation of such junction, or at a spot which is so many links distant from the intersection of the hedge. No. 5 in the field-book is therefore described as commencing from a given length in No. 4, and ending at the ascertained length in No. 1. This line is afterwards continued to No. 9, either as a continuation or a tie line. From a convenient point in No. 5, which has thus been "fixed" as a line, No. 6 commences, and No. 7, connecting it with No. 1, completes a trapezium, and Nos. 8 and 9 form another triangle; which comprises with those already named the general outline of the estate. The line No. 5, continued to join No. 2 and No. 9, affords additional proof of the correctness of the survey; and this line and No. 10 enable the conductor to measure the irregular fences near them. As to the other fences, which are straight, it is only requisite to mark on the lines, Nos. 3, 5, 10, the distances where such straight fences intersect, or *where they would intersect* if continued in a straight line; or, in other words, either the place of the fence, or the place of its *line of direction*, enables the draughtsman to delineate it from the measurement so recorded.

I do not think it necessary to multiply examples; I am rather desirous to put in the simplest possible form a few illustrations which exhibit the general principles to be acted upon; for when these are clearly understood, their application to particular cases will readily occur to those who, like the teacher, are accustomed to geometrical forms. In describing the field operations, however, it may be well to introduce an example of the details included in the field-book.

*First*, then, it will at once appear obvious, that if in measuring a line we attempt to record it by writing downward on the page, we shall find our record travelling backward, as it were: that is, in a direction exactly contrary to that in which we are looking; and this reversal of everything is an element of great confusion and complexity, if we consider the field-book as being in some measure a picture, or representation, of the objects to be measured. The remedy for this is to begin at the bottom of the page, whereby the whole page lies *before us;* exactly in the same manner as the fields or other objects are before us.

Fig. 10.

| | | | |
|---|---|---|---|
| | 21 | 1545 | |
| | 15 | 1495 | |
| | 10 | 1425 | |
| 6 6 | 53·18 | 1353 | |
| 125·100·70 | 56·15 | 1270 | |
| 137·110·82 | 65·28 | 1158 | |
| 137·109 | 82·50 | 1100 | |
| 136·108·78 | 52·13 | 1050 | |
| 138·113·82 | 70·40 | 935 | |
| 140·130 105 | 70 10 | 770 | |
| 140·105 | 70·60 | 720 | |
| 90 | 70·25 | 680 60 | |
| | 60·50 | 660 30·87 | |
| | 33 | 611 40·85 | 140 |
| | 22 | 590 24·63 | 110·150 |
| | | 555 37·73 | 113·152 |
| | | 500 30·55 | 88·120·160 |
| | | 475 42·80 | 118·148 |
| | 35 | 422 42 90 | 121 |
| | 115·50 | 370 58·100 | |
| 154 | 97·48 | 330 60 | |
| 192·130 | 90·50·18 | 270 80 | |
| 160·120·82 | 60 25 | 110 20 | |
| 120·150·130·90 | 60·30 | 00 70 | |
| | | 15 | |

Opposite the 12th milestone on the road leading from H. to I.

No. 1 commencing at the south boundary, on the east side of rivulet, and parish of D., county of E. By F. G., May 1st, 1848.

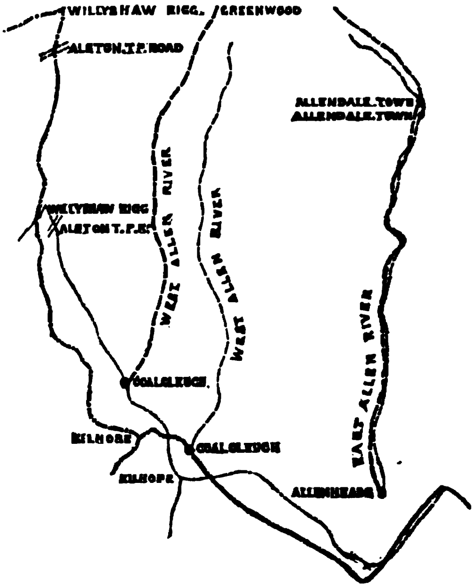
Survey of an estate belonging to A. B., Esq., situated at C.

First; the description of the place, name of proprietor, and date of survey are entered; and next, some brief description of the place where the first line of measurement commences. At this point of commencement the surveyor measures *back* 15 links to a fence, and the starting-point is marked by two ciphers. At this starting-point the surveyor finds on his right hand a fence, 70 links distant; a footpath on the very place of commencement; a small rivulet—of which the east side is 30 links, and the west side 60 links—lies to the left; beyond this is a turnpike-road, the sides being respectively 90 and 130 links; further on is a milestone, and beyond it a fence. These several distances are recorded in the columns of figures, and a rude sketch is made on the chain-line of the field-book as already described, by which the *relative* position of the objects is kept in mind without the necessity of written descriptions. This line for sketching upon, forms a sort of rude approximate plan, and will frequently, in the hands of an able draughtsman, afford a tolerable idea of the exact position, and distances, and points of intersection, such as could by no means be afforded by field-books, in which the figure column represents the chain-line.

A verbal description, in reply to inquiries which may occur to different persons, is better adapted for conveying accurate information on numerous matters of detail which occur in practice, and which may, in fact, be treated in various ways without any detriment to the substantial accuracy of the geometrical conditions which are requisite. To enlarge on these would only extend the length of these observations without adding to their practical value. I would therefore, in reference to such details, rather express the hope that no enlightened member of the professions which are based on the practice of surveying and levelling will ever withhold from the teacher such occasional advice and information as he may be able to afford, for he is thereby following out an extended and benevolent plan of education, which, by embracing a portion of scientific practice, will in time lead to a more general appreciation of science. It is this desire, warmly felt and earnestly carried out, which can alone lead to any great extension of a practical love and knowledge of science. I entirely disapprove of the attempts—which belong rather to former ages than to the present—of shutting up knowledge as a craft and mystery. The men of mystery learnt their own art, but they knew not, and they cared not, for the "mysteries" of others. Hence, not understanding them, nothing but absolute necessity drove them to resort to them; whereas, had the general objects and advantages been known, it is probable that a public appreciation of such advantages would have led to a greatly increased demand for the services of those who, by long practice, had acquired that due knowledge and rapid execution and skilful appliance which long-continued practice can alone impart.

The state of ordinary field surveying, as a useful science, is very far behind what it ought to be. In many large estates no accurate plans exist, and throughout England I believe the number of really scientific plans of landed property is very small compared with the intrinsic value of such records. Many of the plans sent to the Tithe Commissioners were, in point of execution, inferior to what ought to be easily attainable by the limited exertions of the pupils in a village school. By scientific plans, I mean those which are based on correct geometrical principles, and measured with due attention to accuracy as regards the direction of lines, and the correct measure of length. Contiguous estates thus measured, and thus planned, would correspond exactly in their boundaries; experience, however, shows that such correspondence is very rarely to be found in plans of different estates made by different parties. Some opposite examples have reached the extreme limits of absurdity, as in the case of a district plan described to me by the Director of the Ordnance Geological Survey of England. The various proprietors furnished their several plans, which were fitted to each other, beginning with the outer boundaries of the entire district, or parish; and when all were so delineated, there remained a space wholly vacant in the centre, on which the perplexed draughtsman, in order to convey a true idea of the case, inscribed, "This is nothing." Scarcely less amusing was the indifference of a landed proprietor, who showed me a plan of his estate. "I do not see the plantation," said I. "Ah, very true; the plan was made by the parish clerk, and I think he has forgotten it. This field, too, is wrong—*it should be here*," pointing to the other side of the plan. By no means uncommon is it to find, on adding details of brooks and rivulets upon old plans, that they are found apparently running up, instead of downhill; and an example of the great amount of error arising from the use of old and inaccurate plans may be found in county maps, not only as between different counties, but even in the representation of the same county—a difference in a well-defined portion of the western boundary of Northumberland, in the maps respectively published by Fryer and Greenwood, amounting to upwards of two miles; as in the following reduced Fig. 11, where the boundaries are denoted by differently dotted lines. The distance between the rivers East and West Allen varies about a mile, and the distance between Kilhope and Willyshaw Rigg is more than two miles longer on one map than the other. Yet these are the best maps hitherto published, on a large scale, of this county; nor is there any portion of it where accuracy is more desirable, owing to the rich mineral deposits of which these lines of county divisions form the boundary. In short, the representations given by many old maps are frequently so erroneous as to be of little or no practical use; and if the practice of surveying becomes more generally known, and the value of plans more generally appreciated through the instrumentality of the teacher, the professional surveyor will assuredly be benefited; and hence I deem it not less prudent than generous, for every one to aid the teacher in imparting sound general views of all such departments of knowledge as enter into the business of after life, and which admit, as surveying most certainly does, of being included in the routine of school education.

Fig. 11.



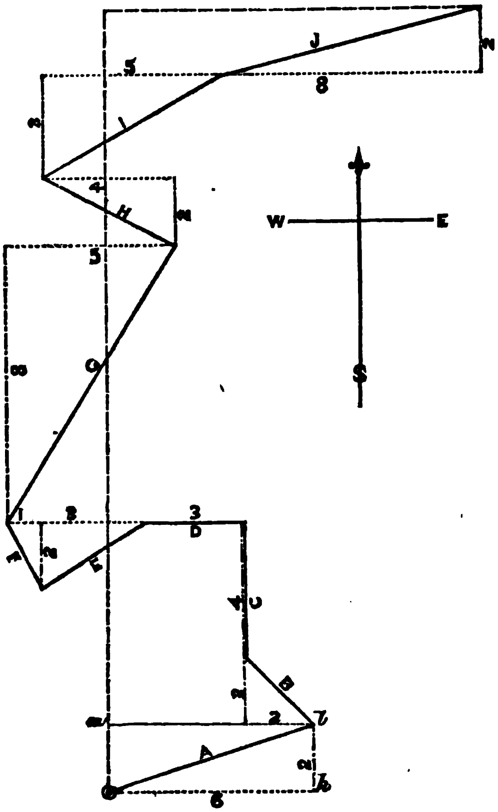
The survey completed, the next operation is the delineation of the lands on a PLAN. For this purpose I recommend a tolerably large table, either level, or with a *very* slight inclination—the ordinary school-desk is too narrow and too steep. Next, it is requisite to have a stock of common cartridge-paper, on which the lines are to be laid down by all the pupils in succession, and a few sheets of drawing-paper, on which a *fair* or finished copy of the plan may be made by more advanced pupils. The other materials required for this drawing or planning class are —black-lead pencils (observing that the commoner sort of pencils leave a mark which is not easily effaced, which is an advantage for writing in the field-book, but for plan-drawing it is desirable to use pencils of a better description, in order that the lines may be taken out); India-rubber; a straight-edge of wood, but steel is better if the funds permit; a *rolling* parallel ruler, about twelve inches in length; scales of chains, one, two, and four chains to an inch: the best scales are of ivory, but cheaper ones are to be had sufficiently clear and good for common use, made of box-wood, and others still less costly and very convenient for use, though of course less durable, are printed on cardboard; a pair of compasses, with moveable legs; a good drawing pen; Indian ink; steel pens for ornamental lettering; a few cakes of good colours, including lake, gamboge, and Prussian blue. With these materials the student is enabled to commence his drawing or plan.

The first consideration is the *scale*, and upon this depends the size of the paper. If only one or two fields of moderate dimensions have been surveyed, one chain may be represented by an inch, and for larger areas the scales of two or four chains to an inch may be adopted. I do not recommend a less scale than four chains per inch in school plans. Next, the student must consider what place his first or main line will occupy on the sheet of paper, as upon this all the rest will depend, and he will then proceed to lay down the principal triangulations which form the skeleton of the plan, following these up with the various connecting lines; for unless all these coincide, or, as it is more familiarly expressed, unless the lines *fit*, it is needless to proceed with the details of any one of them: the only alternative is re-admeasurement. Geometrical truth is aimed at, and must be attained; and in the case of surveys with the chain alone, it is evident that some neglect in the manipulation must have occasioned any discrepancy which may appear in the course of laying down or "*plotting*" the survey.

In surveys of great extent, and especially in mountainous districts, or where ravines of considerable depth and winding course happen to be features of the scenery, the chain alone is scarcely adequate as the only basis of the measurement. In such cases, the *dial* or *theodolite* are called into use. In extensive surveys of this description I have almost invariably used the dial or plain circumferentor, in preference to the theodolite; it is more portable, less costly, presents a wider surface on which to observe the bearing or place of the magnetic needle, and the accuracy of operations performed with this instrument have been tested again and again by the most exact coincidence of surface and subterranean surveys. But whether the circumferentor or theodolite is used, it is obvious that the same principle and mode of reading applies to both. In chain surveying, a *framework*, as it may be called, of *fixed lines*, enables the surveyor to note down every line as beginning at a certain point in a former line, and proceeding to another given point in another line; and so in like manner the laying down or plotting of the lines is easily accomplished, all that is necessary being to measure off the given positions: then draw a straight line connecting them, and if the length of the line thus drawn corresponds exactly with the actually measured length, a strong proof—amounting in some cases, but not all, to demonstration—is afforded. The dial enables the surveyor to proceed from any point in a number of varying directions, which are recorded in the book in the manner already explained; and in order to lay these down on the plan, it is necessary to fix the direction of the meridian line—that is, of the magnetic meridian—and from that line the degrees and minutes are marked off, accordingly as they are east or west of the north or south point of the circle or graduated protractor. In practising with the dial, or circumferentor, for the first time, the pupil should be made to take bearings in four consecutive lines, of one or two, or more chains, as the ground will permit, and at angles varying from each other by 90 degrees, thus—N. 10 E., S. 80 E., S. 10 W., and N. 80 W.; when the end of the operation ought to be exactly at the point of commencement. This practice, and also the drawing of a square on paper, will afford a learner a far more vivid idea of the difference between theory and practice than any description. If, then, a square—one of the simplest of all forms—be so difficult, it is quite obvious that equal or greater difficulty must rest upon all other more complex forms.

In laying down extensive lines of bearings, I have found it useful to apply, as a check upon any occasional error in plotting, the ascertained latitude and departure of every tenth observation—a method so well known by its constant use in navigation as to require only a reference to works on that science; and for the objects of the present paper, it will suffice to give a plain example of the principle. The following Fig. 12 represents, by a strong black line, ten lines of which bearings are supposed to have been taken and laid down; these lines are marked by the first ten letters of the alphabet. By reference to tables, or by calculation, it is found that the end of the line A is 6 chains east of ⊙, by which mark the point of commencement is denoted, and which sign or mark will be used for brevity throughout this illustration; and it (the end of the line A) is also, by means of its oblique direction, 2 chains north of ⊙ as regards latitude, which term is used in navigation in the same sense as in geography; but the *easting* or *westing*, or difference in longitude, is called "departure," meaning departure from the longitude of the point of commencement. Hence it will be easily understood that if we ascertain from a table, or from calculation, the latitude and departure of any bearing and distance, we may lay it down by rectangular lines, as ⊙ *h*, *h l*, or ⊙ *m*, *m l*. In like manner the end of B is 2 chains north and 2 chains west of its point of commencement; the latitude of the end of B is therefore 2+2, or 4 chains north, and 6 ch. east − 2 ch. west = 4 ch. east, departure. If, then, we add all the northings and southings of the ten lines separately, and take the lesser

Fig. 12.



from the greater, we shall have the final result or difference of latitude between ⊙ and the end of the tenth line J; and the like operation with the east and west directions will give the final difference of longitude, coinciding, of course, with the respective lengths of a single line on the meridian, and a single line of latitude drawn from the longitude of ⊙ to the end of the tenth line J. In the example before us we have the following lengths and directions, which I have made as plain and simple as possible, in order to elucidate this mode of practice to any who may not be familiar with its use in Surveying:

| | North. | South. | East. | West. |
|---|---|---|---|---|
| A. | 2 | ,, | 6 | ,, |
| B. | 2 | ,, | ,, | 2 |
| C. | 4 | ,, | ,, | ,, |
| D. | ,, | ,, | ,, | 3 |
| E. | ,, | 2 | ,, | 3 |
| F. | 2 | ,, | ,, | 1 |
| G. | 8 | ,, | 5 | ,, |
| H. | 2 | ,, | ,, | 4 |
| I. | 3 | ,, | 5 | ,, |
| J. | 2 | ,, | 8 | ,, |
| | — | — | — | — |
| | 25 north. | 2 | 24 east. | 13 west. |
| | 2 south. | | 13 west. | |
| | — | | — | |
| | 23 north. | | 11 east. | |

The end of J is thus ascertained to be 23 chains northward from the latitude of ⊙, and 11 chains distant in departure eastward, or in east longitude. When such correction is applied, the calculation and the plottings may be simultaneously in progress, but in different rooms or in different parts of the school, and the results at every tenth line compared.

The ordinary plotting of the field measurements only requires careful attention to the accuracy of the triangulation, and to the careful setting off in a square direction the several objects measured by means of offsets. Each line will thus become a correct geometrical representation of the fences, gates, footpaths, houses, &c., which have been already delineated on the sketching-line of the field-book. When these have been drawn in pencil, it may be useful, on the rough plan, to retain the lines denoting the course of the chain by a faint dotted blue line, as the exact lengths ascertained on these lines may be useful in the subsequent mensuration. The fences and other objects are then to be drawn in Indian ink, with a drawing-pen; and this rough plan is now to be used for the purpose of ascertaining the area of the whole and of each field: and I recommend in schools, that all the main triangles and trapeziums be calculated with the needful additions or reductions necessary to ascertain the total area, and afterwards each field to be separately calculated. I deem it wholly superfluous to occupy your time with any details of mensuration, inasmuch as the ordinary modes of calculation are based on very few and simple problems, which the pupil ought to be entirely master of before he enters on any course of surveying or levelling.

A transfer to drawing-paper for a clean copy or duplicate may be made by means of pricking holes from the rough plan, by means of the pentagraph, by drawing squares, or by a sheet of black-lead tracing-paper, which, under a gentle pressure caused by a blunt point carried over each line on the rough plan, transfers the copy to an underlying sheet of white paper. In some offices a large plate of glass is used, and a copy made by means of the transparency. Much practice is required in all these modes before a practical efficiency can be gained, and any of them serve to accomplish the required purpose. Of course, only the lines of fences, houses, &c., are to be transferred; the chain-lines, and lines used in mensuration of areas, may remain on the rough plan.

It is now usual to finish plans in a much more plain and simple style than what is recommended in many works on surveying. The fields are not shaded with lines or dots, to represent ridges, and fences are usually shown by plain lines, coloured to show boundaries, and with signs indicating to which proprietor the boundary fence belongs, the place of change being marked ⁎. The names of fields may be inserted in italic letters; of houses, in small Roman letters; and the names of adjacent estates and properties may be inserted in plain and conspicuous lettering, avoiding all unnecessary ornament. The scale is of the greatest importance, as is also the bearing of the plan as regards its position to the meridian; and, unless some great objection occurs, it is well to have the top of the plan towards the north. The title may admit of some ornamental lettering; but a few inspections of well-executed plans by skilful surveyors is worth a world of description, and such opportunities of inspection and of copying plans may, I trust, often be afforded to those who desire to avail themselves of such means of placing really good models within the reach of their pupils. I do not know of any published work which contains such plain and useful examples of drawing as are adapted for school purposes. Many of the examples which appear in some such works run wild, if I may so express it, into a quantity of elaborate detail, which must utterly confound and perplex both master and scholar, who are aiming only at practical usefulness. Even the Instructions issued from the Tithe Commission Office in 1837, were not free from this exuberance of detail—this overflowing of signs and symbols, many of which were not only unsuitable, but even impracticable. Indeed, the whole progress of that survey was a lamentable proof of the want of general information on the subject; for, by the adoption of a system which I submitted to the Chairman of the Commission of Inquiry, a national survey might have been completed under very simple and inexpensive arrangements, combining general accuracy with abundant leisure for filling up detail from time to time; and by the adoption of a similar system on a less scale, a number of landed proprietors might procure a scientific basis, or frame-work, of a large tract of country, the separate portions of which might be filled in by the surveying classes of village schools—and that, too, with such checks as to ensure accuracy.

The art of LEVELLING can only be considered as an extension of that of Surveying—the one having reference to the measurement of vertical contours, the other to the measurement of horizontal or slightly inclined areas. The books and other materials used for the one are nearly the same in the other, with the addition of an instrument for taking levels, and a levelling-staff. The principle of levelling may be illustrated by a level of a plain and inexpensive description, and by a painted lath of ten, twelve, or fourteen feet. Whenever a survey embraces ground which is otherwise than level or slightly undulated, the process of levelling becomes necessary, in order to ascertain what reduction is necessary to reduce the hypothenuse to the base of the right-angled triangled, formed by a horizontal line from the bottom of a steep inclination, and a perpendicular line at the other extremity. Some surveyors ascertain the angle of inclination, and make a reduction accordingly at the time; but I recommend an approximate levelling, or a memorandum of the inclination, to be recorded in the field-book, and the distances transferred to a base line from a hypothenusal line, corresponding with the inclination. This, like many other of the minor details of surveying and levelling, is better explained by a single example than by many pages of description. The same remark applies to the manipulations required in adjusting the more elaborate forms of the spirit-level; but in practice I can scarcely imagine any of these more costly instruments being in the hands of any but those whose opportunities of gaining accurate information, supersede the necessity of prolix directions in a general paper of this description. For instance, the very purchase of an instrument of the value of 10*l.* or 12*l.*, implies the means of access to books, and the opportunity of information, which any salesman of such a level would willingly impart. The admirable little treatise, published by Mr. Sims, ought to be in the hands of every teacher who has pupils sufficiently advanced to go into these refinements of the art. The same observation applies to the levelling-staff, of which there are various descriptions; but for the ordinary purposes of school education, a plain-painted lath may suffice for the measurement of inclinations. Different forms of recording levels are adopted by different surveyors, and recommended in different works. The following, Fig. 13, is the form which in practice I most prefer, and which originated, I believe, with Mr. Robert Stephenson, whose early attention to the union of mathematical studies with practical engineering laid the foundation of the eminence he has since so deservedly attained.

Fig. 13.

Levels of the T. P. road, from A. to B. May 1, 1848.
Datum 50 feet below threshold of door.

| | | | | | |
|---|---|---|---|---|---|
| | 50·00 | | 50·00 | R | Above datum. |
| 3·50 | 9·40 | 5·20 | 4·20 | | |
| | | | 54·20 | R | |
| 6·60 | 13·70 | 2·10 | 11·60 | | |
| | | | 65·80 | R | |
| 7·40 | 3·15 | 10·45 | 7·30 | | |
| | | | 58·50 | R | |
| 10·90 | 2·75 | 12·55 | 9·80 | | |
| | | | 48·70 | R | |
| 13·75 | 1·60 | 11·70 | 10·10 | | × Toll-bar. |
| | | | 38·60 | R | |
| 16·25 | 5·40 | 0·15 | 5·25 | | |
| | | | 43·85 | R | |
| 19·95 | 11·45 | 1·54 | 10·30 | | |
| | | | 45·15 | R | |
| 21·90 | 12·95 | 1·10 | 11·85 | | |
| | | | 66·00 | R | |
| 24·15 | 7·05 | 4·25 | 2·80 | | |
| | | | 68·80 | R | |
| 27·60 | 4·25 | 6·15 | 1·90 | | Opposite House. |
| | | | 66·90 | R | B.M. on door thresh. |
| 31·00 | 6·15 | 10·90 | 4·75 | | |
| | | | 62·15 | R | |
| 34·50 | 5·40 | 9·65 | 4·25 | | |
| | 133·25<br>75·35 | 75·35 | 57·90 | R | at B. |
| | 57·90 | | | | |

For delineating levels, the same materials as in surveying are necessary; and, in short, it will be found that when a class has become well acquainted with the principles and practice of surveying, they will readily acquire the knowledge of levelling, assisted by the occasional aids to which I have alluded. In the field, the chain-measurements are the same; the plotting of the lines levelled over is made by means of a scale of lengths, and the section is plotted either to the same, or to an enlarged scale, according as the nature of the case requires. There are two considerations which appear worth naming: the first is, that the student's first field-levelling should be a circuit ending where he began; for if all the elevations taken exactly equal the depressions, nothing can be a surer test alike of the accuracy of the instruments employed, and of the care in using them. The other is, that whatever distortion of scale be adopted—as, for instance, four chains to an inch in length, and forty feet to an inch in height; the pupil should also lay down the section on a true scale—that is, four chains to an inch in length, and four chains, or 264 feet, in height; by which means he will obtain a correct idea of the small amount of variation in long distances, between a horizontal line and the contour of hills; upon which a fallacious idea obtains in most minds—many persons, for instance, in sketching a line to represent the inclination of Dean-street, in this town, would draw a line two or three times more inclined than the case requires—the steepest part of it rises one foot in nine; and a line rising at that rate appears to the eye much less steep than would be supposed on a view of the street, owing to the foreshortening, which presents the full height, but lessens the apparent distance. The following figure 15, represents the mode in which the levelling instrument is placed for taking two observations at each setting; and the results, as marked on the diagram, and recorded in the field-book or levelling-book, presents a ready index to the more complicated examples, which, being only a repetition of the like operations, are equally simple in principle.

Fig. 14.

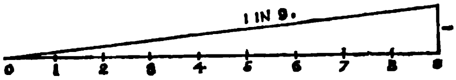
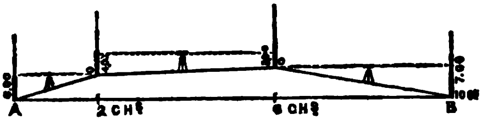


Fig. 15.



Levels from A. to B.

| | | | | | |
|---|---|---|---|---|---|
| 2·00 | 6·00 | 0·00 | 6·00 | R | |
| 6·00 | 4·00 | 3·00 | 1·00 | | |
| | | | 7·00 | R | |
| 10·00 | 0·00 | 7·00 | 7·00 | | at B. |
| | 10·00 | 10 00 | 0·00 | | |

I have endeavoured to present such a general outline of surveying and levelling as may bring the subject fairly within the consideration of every member of this respectable and useful Association, which by the selection of such a subject has evinced a desire to extend the range of ordinary teaching, and to base such extension not upon the various recommendations of writers who have entered into numerous and sometimes complicated details, but upon such as might be furnished by one accustomed to the practice of the art in this district, and in the present day. I greatly esteem the honour done me by the request of the association, and still more highly will I esteem it, if it shall be found to conduce to some practical end. I have endeavoured to indicate the manner in which the reading, writing, and calculations of the surveyor may be made an attractive object of indoor study prior to the more advanced students' adventuring into the field. The class, when in the field, are by these preliminary means enabled to proceed without the constant attendance, and, indeed, with only occasional attendance, by the master or chief conductors of the ordinary business of the school. The drawing operations bring the students again under the teacher's eye in the school. Under such conditions, extreme order and strict discipline are duties which devolve on the pupil entrusted with the conducting of the survey. With firmness, order, and decision, he is to unite gentleness and courtesy to the pupils employed under him; and this in itself, let me observe, is *education* in one of its highest and most important forms. Harshness, rudeness, haste, are inadmissable in the conduct of the director; activity and willing obedience are to be inculcated on the subordinate members of the class. No opportunity is to be lost of impressing such sentiments—they alone can render the proceedings of a class harmonious and agreeable. "Let gentleness your strong enforcement be," is the true maxim in every department of life, whether in or out of school; and I take this opportunity of saying, that there is much need to apply this in general practice as between the employer and the employed—it is a bond of union alike recommended by all the sanctions of religion, and the interests of all classes; and in the absence of the superior authority of the school, the conductor of a surveying-class will find it the only means of maintaining a due subordination. By this means the field-practice would in reality become a sort of holiday—an occupation of healthy and pleasurable excitement; a means of encouraging active merit, and training young men not only in an agreeable and useful pursuit, but also in some of those qualities which tend most to promote their future welfare in this world, and for ever.

I am unwilling to conclude this paper—necessarily imperfect as an elucidation of details, and only embracing elementary progress and general principles—without offering a suggestion which may possibly be found of practical use in attaining the ends for which it is to be presumed this paper has been requested; viz., the advancement of surveying and levelling, as a branch of education in the schools of this district, through the instrumentality of this Association. It is this,—that a select Committee be formed of members of the Association to take cognizance of the subject by obtaining needful information, and by procuring in the most convenient places, and at the least possible price, such instruments and materials as may be required by teachers about to introduce the methods I have described, or any similar system, as a part of the education conducted in their respective schools. For example; if ten, or fifteen, or twenty schools were about to include surveying as a branch of the ordinary routine, the instruments, field-books, pencils, paper, &c., &c., could be obtained in wholesale quantities, and some cheap formula or directions prepared under the sanction of such committee, to whom applications for all such information could be addressed.

One of the first duties of such a Committee would be to ascertain the *least cost* at which the absolutely indispensable materials could be had for village schools, to furnish such information, as well as supply such materials at wholesale prices, thereby securing a uniformity throughout the district. I throw out this recommendation because I am persuaded that many teachers of the humbler class would seek for, and probably be encouraged to obtain from such a committee of *teachers*, information and materials which he would scarcely know how to apply for in the several establishments where they are respectively sold. Such an arrangement would possibly have, in some degree, the effect of giving an additional importance and business-like character to the Association; and as I would have the whole of these purchases and distributions detailed in your annual Report, I need scarcely say that the public would thus obtain an additional means of knowing in what schools arrangements of this practical character were in progress; nor would I despair of such proceedings being regarded as an additional claim on the encouragement and support of the public. It is with reference to some such result that I have mainly studied the character of this paper; and I can only once more express the gratification I shall feel if any permanent advantages can be conferred either upon the schoolmasters or the scholars in the north of England by introducing or extending this or any other of the useful arts as a part of ordinary education.

## HOME CORRESPONDENCE.

### CONSUMPTION OF SMOKE.

Price's Patent Candle Company, Belmont.

DEAR SIR,—Your note of the 31st October asks the question so generally, that I think the best answer is to give you our experience as smoke-consumers from the beginning. We went through the usual ordeal of projectors with schemes plausible enough to make us try them, and these failing, we were discouraged in making further attempts, until, on establishing a branch manufactory at Battersea, our neighbours complaining of the smoke made us try again.

We then began with Keymer's patent. His plan is to use anthracite, with a fan, the fire-bars being set in troughs of water: this furnace gave a splendid flame, without smoke, and got up steam very quickly; but the supply of the coal becoming very irregular, and the price rising, led us, in 1846, to try Inche's patent plan, which we were told gave the same perfect absence of smoke, and with cheap coal.

We continue to work these original Inche's furnaces (the bars of course having been renewed), and have put up others more strongly constructed and less liable to break down, especially since the addition of clutches to throw them out of gear on a strain coming beyond that which they are calculated to resist. A person named Hazeldine was employed in putting up the earlier of our Inche's furnaces, who, observing that we had a 90-horse marine boiler with four fireplaces, in which we continued to use dear fuel, offered to fit up an apparatus that should work as well as Inche's, be cheaper in its first cost, and yet go into the small furnace space. We promised that if he did as he said, we would recommend his furnace among our friends. We put up one, worked it seven months against its three neighbours, which burnt coke as before, and being well satisfied with the results altered the three to his plan; and finding these succeed, and our former moves having been successful—the making no smoke, and using cheap fuel—we were induced to try a third—a cheaper apparatus—to effect these results, and ordered a large apparatus, under Hazeldine's patent, for a 30-horse boiler: this answered perfectly. Soon after we were recommended to try Hall's patent; and after seeing it at work at the Post-office, and that the princiwas the same as that of the other two, and that the apparatus was promising, we put up one of each—Inche's, Hazeldine's, and Hall's—under three exactly similar 30-horse boilers, having distinct feed heads. These, after we had measured the water let in, and weighed the coals used, led us to the conclusion that the only points to look to in future were, the first cost of the furnaces, and their liability to get out of order. Latterly, some of the engineers connected with the Sydenham Crystal Palace, who were considering what furnaces to put up, asked to see ours, and for our opinion. We told them that, as engineers, they were competent to judge for themselves; but that they were welcome to try any experiments, to ask any questions, and on reporting the answers, that we would see that they were correct—our only stipulation being, that they should tell us the conclusion they came to. They chose Hazeldine's. At some new works we are now putting up near Liverpool, we have fourteen 35 horse-power boilers. Having thought that the proprietors of Inche's patent had not behaved very wisely towards us, believing that they had put up furnaces cheaper for new customers than for us, their old ones, we told them that unless they knocked off some patent royalty, we should put up all our furnaces upon Hazeldine's plan. They met us reasonably, so we determined upon six of theirs and eight of Hazeldine's. We offered Mr. Hall, if he would charge only a moderate royalty, to put up one furnace under his plan, that he might be represented, and that we might say at Liverpool, as we can say here, that we work three distinct smoke-consuming apparatus, all giving perfect results; but he stuck by his high royalty, and refused.

You will not wonder, after the above, that it seems odd to us to hear of the impossibility of consuming smoke, and to see people, regardless of their pockets, sending good fuel up their chimneys to annoy their neighbours. I should have mentioned, that our judgment has been formed upon nineteen smoke-consuming furnaces at our works at Battersea and Vauxhall. I believe, however, that one reason why none of the above furnaces have come into more general use is that, apparently, the proprietors have tried to make money by a high royalty on a few furnaces, instead of tenfold the amount by a small royalty on a great many furnaces. All three plans are perfect smoke-consumers, though, of course, if the work for which steam is required has to be checked, and the front of the furnace is raised for the purpose, and the motion stopped, on resuming work they are stoked, and for the time become ordinary furnaces, and give off smoke like them.

All three are upon the same principle: a very small continuous supply of fuel at the front of the grate, the smoke always being made in small quantities, combines with the air that passes through the bars, and is burnt before it can escape. All three have the advantage that there is no opening of fire-doors, and therefore an avoidance of the rush of cold air, which must have an injurious effect by contracting the boiler plates, in addition to the loss of heat. The only comparison we have to give of smoke-consumers with old-fashioned furnaces, is that our smoke-consumers do as much work with small coal as the old furnaces did with large. We tried a smoke-consumer, firing and stoking as in common furnaces, and found the coal used to be 12 per cent. more than when the grate was used as a smoke-consumer. As I have been asked whether we have any interest in any of the above patents, I may mention that we have not, nor ever have had any; and that our only advantage from the brewers and others who have seen our furnaces and asked our opinion, is, that some of them have had the grace to introduce our machinery oil into their works, which was as much to their advantage as ours.

I am, dear Sir,
Yours truly,
8 November, 1853. GEO. F. WILSON.

## FLAX, AND ITS PRODUCTS, IN IRELAND.

*Contributed by William Charley, Seymour-hill, Belfast.*

### LETTER III.

IN my last letter, I alluded to the decline of the great Linen Mart of Dublin, and endeavoured to show the cause. The following description, given in 1819, of the Belfast *White* Linen-hall, explains the reason of its being built, which will be found confirmatory of my views.

"It is a large hollow square, erected by subscription, on the site of the Castle Gardens, in the year 1783, with intent of removing the sales of white linen from Dublin Hall to the heart of the manufacture.

Commission goods received by the Factors in nine years, from 1810 to 1818:

| Years. | Packages. | Years. | Packages. |
|---|---|---|---|
| 1810 | 159 | 1815 | 636 |
| 1811 | 206 | 1816 | 374 |
| 1812 | 247 | 1817 | 626 |
| 1813 | 487 | 1818 | 1241 |
| 1814 | 561 | | |

Total, 4,637 *packages*; average value, 65*l*. each.

The major part of those linens were exported to America and the West Indies." (*See* Thomas Bradshaw's "Directory," 1819.)

The same authority faithfully describes the Brown Linen-market of Lisburn (a town seven miles west of Belfast, beautifully situated on the river Lagan.) After detailing the settlement of Mr. Louis Crommelin, of St. Quentin, France, in the neighbourhood of Lisburn, with his companions in exile,[*] the compiler continues:

"The virtuous conduct and civilized manners of these good people, were of great advantage to this place; and their skill and industry set an example to those who were concerned in the same business as they were, which soon had the effect of raising the quality of their manufacture to a degree of excellence unknown till then; and the linens and cambrics made in the neighbourhood, and sold in Lisburn market, have, until this day, kept up their superior character."

At this time (1819), and for many years after, the entire trade in BROWN linens was done in the provincial towns; the weavers purchased the necessary yarn, wove the cloth at home, and brought the pieces from the looms to the nearest suitable market, where the goods were purchased by the merchants or their agents. These merchants generally were proprietors of bleach-works; their business was to make the linen white and ready for use, and bring it for sale, as before explained, to the White Linen-hall of Dublin, at least while the monopoly existed there; afterwards, when that market, in the course of events, was superseded, these gentlemen were the enterprising shippers and traders, not only to England, but to the most distant foreign countries. This leading branch of the trade required such an amount of capital, that the parties engaged therein were men of considerable property and intelligence.

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[*] The following inscription is to be seen on a monumental tablet in the graveyard of Lisburn Cathedral Church:

"Six feet opposite lies the body of LOUIS CROMMELIN, born at St. Quentin, in France, (only son of Louis Crommelin, Director of the Linen Manufacture, and Anne his wife,) who died, beloved of all, aged twenty eight years, on 1st July, 1711. 'Luge viator, et ut ille dum vita manebat, suspice cœlum despice mundum et respice finem.'

"Also, MARY MADELAINE BERNIERE, wife of Capt. Berniere, only daughter of Louis Crommelin," &c. &c.

There appears to be no monument existing in memory of the senior Mons. Crommelin.

Forty-five years ago, bills of exchange and bank-notes were not so available for raising finances and making payments as at the present day; so the buyers used often to carry their bags of gold with them, as they rode from town to town, attending the markets and making their purchases, which were settled for in coin; to prevent any risk of robbery they often joined company and made parties for the road, and many a merry ride and pleasant evening these good-humoured opponents enjoyed together.

For the regulation of the Brown Linen-markets the Linen Board provided paid inspectors; their duty was to examine the linen brought for sale, and to certify to the quality being genuine and sound.

These inspectors were styled, "Seal-masters;" and on each piece, before admission to the *Hall* or market, the inspector of the district had to affix his seal, so if any buyer was deceived in quality he had a remedy against the "Seal-master;" to whom he returned the piece found *imperfect*, and the "Seal-master" had to allow compensation; in his turn, he of course had to recover from the weaver. This market system is now gradually wearing out; instead of the petty dealers who bought the handspun yarn in small quantities to make one or two pieces *per month*, we have large manufacturers, *each* buying perhaps weekly quantities of yarn from the spinners, equal to the supply of some of the old markets; and several manufacturers now are proprietors of extensive mills, and are applying steam-power looms to the production of cloth. The principal markets in the old-fashioned style still in existence are Ballymena, noted for light four-fourth linens; Lurgan, for lawns and diapers; Coleraine and Ballymena, for seven-eighths fine linens; and Maghuafelt, Moulymore, &c., for low seven-eighths linen. In Belfast *Brown*-hall, a few good four-fourths are sold; but Lisburn *Brown*-market, once so celebrated for lawns, &c., is now extinct, owing to the cambric trade being lately absorbed by the manufacture of *bordered* handkerchiefs; so that all the plain linens brought by masses for sale, are now taken to Lurgan. There are some other small markets, but their "course is almost run;" indeed, it must be confessed that the concentration of the entire trade into fewer and richer hands has tended greatly to reduce *the cost*, and consequently to extend the *demand* for the manufacture.

A considerable portion of the time of the Linen Board in Dublin was occupied in the superintendence and revision of these provincial markets. No doubt the extreme particularity always displayed by them caused the inspectors to be very attentive to their duties as "Seal-masters;" and thus contributed directly to insure the merchant a perfectly made style of fabric, instead of leaving him at the mercy of a number of poor and cunning artizans, whose dwellings, scattered over a wide expanse of country, would be almost inaccessible for the purpose of redress to the passing buyer. An account of the different orders and reprimands of the trustees to their officers would be of no service or interest in this paper, and I will therefore pass on to other subjects.

The principle and practice of "Bounties" appear strange to a merchant of the present day. The following extract shows to what extent this encouragement was applied. (*See* Report 1816):

| "Premiums given last year | £ | *s.* | *d.* |
|---|---|---|---|
| Manufacturing sail-cloth, canvass, duck, &c., from mill-spun yarn | 11,229 | 18 | 4 |
| Manufacturing thread lace . . | 77 | 6 | 0 |
| Imitating Bristol candlewick . . | 53 | 15 | 0 |
| Spinning fine yarn . . . . | 163 | 15 | 6 |
| Total Premiums . | £11,524 | 14 | 10 |
| "Grants: | £ | *s.* | *d.* |
| Utensils to trustees . . . . | 4,337 | 17 | 2 |
| Utensils to public institutions . . | 969 | 17 | 2 |
| Branding flax-seed . . . . | 276 | 9 | 3 |
| Branding utensils . . . . | 132 | 15 | 4 |
| Total Grants . | £5,716 | 18 | 11" |

During the infancy of the manufacture some stimulants were perhaps necessary to promote the production of goods, but the great tendency of all such adventitious aid is, to encourage fraud and trickery: that such did take place, and that decided steps were required to check the extension of the evil, there can be little doubt. On 3rd August, 1816, the Custom-house authorities wrote to the Trustees: "The Commissioners of His Majesty's Customs having had under consideration certain regulations, in order to prevent frauds in the export of Bounty linens, and at the same time to unite security to the revenue, with convenience to the merchant, I am directed to transmit to you herewith, for the information of the Trustees of the linen manufacture and their officers, a copy of the regulations which the Board have ordered to be carried into effect on this subject; and to submit to the Trustees, that a large room or warehouse be set apart at the Linen Hall, for the reception of all goods made up in private warehouses or public calenders, &c., to which they must be sent for examination."

I find that in 1820, a meeting of linen-manufacturers was held at *Aberdeen*, on this very subject of Bounties; the third resolution passed was, "That it is the decided conviction of this meeting, founded upon long practical experience, that the Bounty which has now for nearly seventy years been granted upon the Exportation of British and *Irish* Linens, is of the most vital importance to the preservation of that valuable branch of trade; and that without such Bounty, it would be quite impossible for the British and Irish manufacturers to compete in foreign markets with the linen fabrics of the Continent, where the price of the raw material, as well as labour, is at all times extremely low." The fourth resolution requested Parliament to have the Bounties on the exportation of linen *rendered perpetual*—"a measure in the opinion of the meeting *essentially requisite to the stability* and *permanency of the manufacturer!*" If any of the gentlemen who were present at this meeting be fortunate enough to be now alive, they will perceive that the linen trade is far more healthy in its tone at present, than it was in the weakly season of Bounties. It is a singular fact, that perhaps the most backward part of the Irish manufacture in 1853 is the very one that received most money for encouragement during the ten years previous to 1823—namely, sail-cloth and canvass. In these Scotland and England still carry off the palm, if one can judge from the specimens seen in the Great Exhibition of 1851; at any rate, Britain now appears to supply the great dockyards and the principal markets with this class of flaxen fabric.

In opposition to the opinion of the Aberdeen merchants already given, which was cordially supported by many Irish gentlemen, I beg, in conclusion, to quote the judicious remarks of the celebrated Adam Smith: "The effect of Bounties, like that of all such expedients of the mercantile system, can only be to force the trade of a country into a channel much less advantageous than that in which it would naturally run of its own account."

N.B.—Erratum in printing last letter, 14th line, for "empowering," read *improving*.)

## TO CORRESPONDENTS

The publication of Mr. Septimus Piesse's letter "On Chemistry and Perfumery," and Mr. T. W. Booker, M.P., "On Cider," are unavoidably deferred.

## MEETINGS FOR THE ENSUING WEEK.

Mon. Institute of Brit. Architects, 8.—Prof. Donaldson, "On the Buildings of Lille, and on a Collection of Drawings presented to Lille by the late Chevalier Wicars," with Illustrations.
Geographical, 8½.
Tues. Pathological, 7.
Linnæan, 8.
Civil Engineers, 8.—Mr. A. Henderson, "Large Ocean Steamers; their scientific construction, capabilities for navigation, and commercial economy."
Wed. Society of Arts, 8.—Chairman's Address, and Opening of Exhibition of Inventions.
Thurs. Royal, 8½.
Fri. Architectural Assoc., 8.
Sat. Medical, 8.

## PATENT LAW AMENDMENT ACT, 1852.

The Lord Chancellor in granting an application, with reference to a patent, took occasion to observe, that he had received during the recess several applications for extension of the time for filing specifications, &c., under the recent Patent Act. It would be well for the public to know that such indulgence could only be granted in cases where there had been no neglect or default on the part of the applicant or his agent. There would, however, shortly be a meeting of the Patent Commissioners, when the question would be brought under their consideration.

### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

*From Gazette, 4th November*, 1853.

*Dated 9th August*, 1853.

1851. T. Y. Hall, Newcastle-upon-Tyne—Safety-lamps, and method applicable to smoke consumption.

*Dated 10th August.*

1861. A. Prince, 4, Trafalgar-square—Press for lithography, &c. (A communication.)

*Dated 12th August.*

1888. W. L. Tizard, Aldgate—Combination of materials for binding purposes, and machinery for same.

*Dated 17th August.*

1923. F. A. V. Delarbre, 9, Broad-street-buildings—Treating fibrous substances.

*Dated 27th August.*

1993. S. Taylor, 53, King-street, Manchester—Apparatus for generating carbonic acid gas.

*Dated 8th September.*

2065. R. Harrington, Witham, Essex—Umbrellas, &c.

*Dated 9th September.*

2072. J. Radford, Cheltenham—Clocks.

*Dated 16th September.*

2156. F. B. Newton, Manchester—Method of cutting, partially dispensing with seams.

*Dated 4th October.*

2262. W. Pearce, Haigh, Wigan—Excavating coal by machinery.

*Dated 7th October.*

2297. J. Onions, 3, Park-terrace, and S. Bromhead, Marlborough Estate, Peckham—Steam-engine boilers.

*Dated 14th October.*

2365. S. Bromhead, Peckham—Emigrant's house and hinges.

*Dated 17th October.*

2397. J. J. Haite and W. Leach, New Coventry-street—Pistons of valved musical instruments.

*Dated 20th October.*

2421. W. Russell, Birmingham—Manufacture of copper tubes.
2423. J. France, North Wharf road, Paddington—Mortising-machine.
2425. G. Gourgas, Paris—Buffer traction or suspension springs.
2427. W. Melville, Burntisland, Fife—Drawing ships out of water. (A communication.)

*Dated 21st October.*

2429. J. H. Johnson, 47, Lincoln's-inn Fields—Apparatus for sustaining bodies in the water. (A communication.)
2430. J. H. Johnson, 47, Lincoln's-inn Fields—Treatment of gutta percha. (A communication.)
2431. C. Crop, Farnworth, Lancashire, and J. Crosby, Manchester—Weaving machinery.
2433. J. Warburton, Addingham, Yorkshire—Preparation of rape-seed oil. (A communication.)
2435. J. P. F. Challeton, Paris, and 16, Castle-street, Holborn—Carbonizing and distilling peat, &c.
2436. P. M. Fouque, L. R. Hébert, and V. E. D. le Marneur, Paris, and 16, Castle street, Holborn—A fortune-rudder in bronze.
2437. S. Loyd, jun., Wednesbury—Turntables.
2438. J. Greenbank and S. Pilkington, Withnell, Lancashire—Spinning machinery, &c.
2439. H. Cook, Devonshire-terrace, and A. Cook, Upper Berkeley-street—Communication between guard and driver.

*Dated 22nd October.*

2441. H. Bentley, Salford—Steam-boilers and fixing same.
2442. J. Baily, 113, Mount-street, Grosvenor-square—Cure of roup and other diseases in fowls and poultry.
2444. T. Connell, Cork—Safety apparatus and signals on railways.
2445. T. Walker, Pimlico—Railway-break.
2446. H. Greenfield, Old Cavendish-street—Power from carbonic acid gas.
2447. J. H. Johnson, 47, Lincoln's-inn Fields—Mills for grinding. (A communication.)

*Dated 24th October.*

2448. H. Kraut, Zurich—Regulating temperature.
2449. T. Stainton, South Shields—Steering apparatus.
2450. J. D. Young, Westminster—Casting.
2451. C. Brewster, Dunmow—Printing-machines. (A communication.)
2453. A. Hett, Stoke Newington—Smoke prevention.

*Dated 25th October.*

2458. J. Fordred, Dover, and T. Boyle, Forest-gate, Essex—Daylight-reflectors.
2460. A. Curtis, Sarratt Mills, Herts, and B. Donkin, jun., Bermondsey—Machinery for cutting rags, &c.
2464. D. Bogue, Fleet-street—Producing printing surfaces. (A communication.)
2466. C. Goodyear, Avenue-road, St. John's-wood—Boots and shoes.

*Dated 26th October.*

2470. G. G. Woodward, Lesswels, Kidderminster—Carpets.
2472. G. H. Palmer, Sheffield—Air-furnaces for fusion of steel, &c.
2474. W. Penrose, Landore Silver Works, Swansea—Reduction of silver ores.
2476. P. B O'Neil, 39, Rue Miromenil, Paris—Screw wrenches.
2478. U. Lane, North-street, Brighton—Measuring time.
2480. T. Dunn, Windsor-bridge Iron Works, Pendleton, and W. Gough, 21, Old Compton-street, Soho—Manufacture of veneers, and machinery for same.

### WEEKLY LIST OF PATENTS SEALED.

*Sealed 2nd November*, 1853.

1057. Henry Constantine Jennings, of Great Tower-street—Improvements in the manufacture of soap.
1060. James Reeves, of Bridgwater-gardens, Barbican—Improved machinery for forging, stamping, crushing, or otherwise.
1062. Auguste Edouard Loradoux Bellford, of Castle-street—Improvements in the extraction and manufacture of sugar, and of saccharine matters. (A communication.)
1065. Auguste Edouard Loradoux Bellford, of Castle-street—Improvements in sawing-machines for slitting or re-sawing plank and other timber by means of circular saws. (A communication.)

*Sealed 3rd November.*

1071. Thomas Claridge, of Bilston—Improved machinery for cutting or shearing metals.
1074. George Frederic Goble, of Fish-street Hill—Improvements in locks.
1079. Thomas Chambers and John Chambers, of the Thorncliffe Iron Works, near Sheffield—Improvements in kitchen sinks.
1085. Edward Walmsley, of Heaton Norris—Improved modes of preventing accidents arising from an insufficient supply of water in steam-boilers.
1088. Jean Brando Gianeti, of Paris—Applying the ascensional force of balloons to various useful purposes.

1133. George England, of Hatcham Iron Works, New Cross—Improvements in screw-jacks.
1145. Gregory Kane, of Dublin — Construction of portable houses, or portions thereof, out of parts, which may be used for other purposes.
1152. Alexander Chaplin, of Glasgow—Improvements in apparatus for the transmission of aëriform bodies.
1160. Richard Edmondson, of Blackburn — Improvements in the manufacture of covered corded textile fabrics, and in machinery to be used for that purpose.
1178. Charles Pooley, of Manchester—Improved mode of feeding machines for opening, cleaning, blowing, and scutching.
1186. Richard Archibald Brooman, of Fleet-street—Improvements in the manufacture of hats. (A communication.)
1194. Thomas Stephen Holt, of Manchester—Improvements in steam-engines, which improvements are also applicable to the machinery or apparatus connected to steam-boilers.
1203. John Drumgoole Brady, of Cambridge-terrace—Improvements in knapsacks.
1228. John Barsham, of Kingston-upon-Thames—Improvements in drying bricks, peat, and other articles.
1229. John Barsham, of Kingston-upon-Thames — Improvements in charring peat and other vegetable substances, and in burning lime.
1230. Edward Thornhill Simpson, of Wakefield — Improvements in the manufacture of manure.
1233. John Oakey, of Blackfriars-road — Improvements in reducing emery, glass, and other like substances.
1237. Samuel Wright, of Church street, Shoreditch—Making a gas, steam, air, or liquid safety-tap.
1247. Charles Cowper, of Kensington—Improvements in steam-boilers.
1259. Louis Gervais Dieudonné Buffet Delmas Ducayla, of Bourdeaux—Improved manufacture of artificial fuel. (A communication.)
1300. William Weatherley and William Jordan, of Chatham——Improvements in the stuffing-boxes of piston-rods.
1316. Caleb Hill, of Cheddar—Improvements in the construction of stays.
1324. John Henry Johnson, of Lincoln's-inn Fields—Improvements in removing the gummy or glutinous matter from textile and other materials. (A commuication.)
1345. Maxwell Scott, of Birkenhead—Improvements in propelling.
1374. Joseph Gyde, of Tooley-street—Improvements in mills and apparatus for grinding and dressing corn and various substances.
1394. George Bazett Colvin Leverson, of St. Helen's-place—A new application, construction, and arrangement of springs for carriages and such-like purposes.
1420. Samuel Frankham, of Greenland-place, Judd-street—Improved construction of coupling-joint, applicable to pipes, vessels of capacity, and other like uses.
1473. Solomon Solomon, of Aldgate, and Samuel Mills, of St. George's-in-the-East—Improvements in axle-boxes for locomotive engines, railway and other carriages, applicable to the bearings of machinery.
1660. Frederick Ransome, of Ipswich—Improvements in the manufacture of artificial stone and similar wares.
1693. Charles Goodyear, of St. John's-wood—Improvements in the manufacture of pens, pencils, and instruments used when writing, marking, and drawing.
1694. Charles Goodyear, of St. John's-wood—Improvements in preparing India-rubber.
1695. Charles Goodyear, of St. John's-wood—Improvements in the manufacture of beds, seats, and other hollow flexible articles to contain air.
1818. James Billings, of Greenwich—Improvements in roofing buildings.
1829. William Smith and Thomas Phillips, of Snow-hill—Improved boiler.
1852. William Rowan, of Belfast—Improvements in looms for weaving, and apparatus connected therewith.
1855. William Baines, of Coverdale-terrace, near Birmingham—Improvements in railways.
1872. Henry Moore Naylor, of Montpelier-row, Birmingham—Improvements in affixing postage and other stamps.
1876. William Longmaid, of Beaumont-square, Mile End—Improvements in the manufacture of manure.
1921. John Heritage, of Warwick—Improvement in the manufacture of bricks, pipes, tiles, coping, and such other articles as are or may be moulded in clay.
1943. George Heyes, of Bolton—Improvements in looms.
1952. John Steven, of Edinburgh—Improved axle-box for railway carriages and wagons.
1958. Moses Poole, of Avenue-road, Regent's-park—Improvements in crushing and pulverizing quartz and other substances. (A communication.)
1960. Thomas Charles Medwin, of Blackfriars-road—Improvements in steam-engine boilers.
1974. Edward Heard, of Regent-street, Lambeth—Mixture or composition of chemical agents for rendering sea water fit for washing, and for softening hard water for other similar purposes.
1976. Alfred Beck Tompson, of Richmond—Improved spring door-hinge. (A communication.)
1988. Charles William Lancaster, of New Bond-street—Method of, and machinery for, manufacturing or producing certain descriptions of gun and pistol-barrels.
1994. Alfred Vincent Newton, of Chancery-lane—Improved construction of steam-hammer. (A communication.)
1998. John Foss, of Aldgate—Improvements in printing apparatus.
2008. Charles Goodyear, of Avenue-road, St. John's-wood—Improvements in rules, graduated scales, and measuring instruments.
2009. Charles Goodyear, of Avenue-road, St. John's-wood—Improvements in the manufacture and ornamenting or coating of articles, when compounds containing India-rubber are used.
2012. Alfred Vincent Newton, of Chancery-lane—Improved process of dyeing, part of which process is also applicable to bleaching. (A communication.)
2114. William Edward Newton, of Chancery-lane—Improved machinery for cleaning grain and seeds. (A communication.)
2020. William Edward Newton, of Chancery-lane—Improved machinery for reaping and gathering corn, grain, and other agricultural produce. (A communication.)
2046. William Edward Newton, of Chancery-lane—Improvements in breech-loading guns. (A communication.)
2060. Western Grimshaw, of Morsley, Ireland, and Ellis Rowland, of the same place—Improvements in the manufacture of bricks.
2082. Jonathan Amory, of Boston, United States of America—Improvements in furnaces.

*Sealed 5th November.*

1106. Matthias Edward Boura, of Crayford—Improvements in saddlery and harness.
1110. Thomas Fearnley, of Bradford, Yorkshire—Improvements in steam-boilers.
1116. John Ryan Danks and Bernard Peard Walker, both of Wolverhampton—Improvements in machinery or apparatus for the manufacture of nails.
1118. John Thomas Stroud, of Birmingham—Improvements in the valves of pressure-lamps, and in lamp-burners.
1120. Peter Armand le Comte de Fontainemoreau, of South-street, Finsbury—Improvements in the manufacture of hat-plush. (A communication.)
1123. Mariano Riers, of Madrid—Improvements in fire-arms.
1124. Francesco Capeccioni, of Castle-street—Improvements in the manufacture of candles.
1126. Christopher Richard Norris Palmer, of Amwell—Improved mode of communicating or signalling between the guard and engine-drivers on a railway train, also applicable to other purposes.
2151. Francis Higginson, of King William-street—Improvements in the means of setting in motion and propelling ships, vessels, and boats of every description upon seas, rivers, canals, and inland waters.

*Sealed 7th November.*

1129. Hesketh Hughes and William Thomas Denham, both of Cottage-place, City-road—Improvements in machinery for weaving.

## WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

| Date of Registration. | No. in the Register. | Title. | Proprietor's Name. | Address. |
|---|---|---|---|---|
| Nov. 8 | 3528 | The Reticulated Collar-case.................... | Charles Gammon............... | 2, Bloomsbury-square. |
| „ 9 | 3529 | Billiard Bagatelle Table ...................... | Samuel Twist and William Morris. | Birmingham. |

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# ERRATA.

Page 238, column 2, line 24—for "*rich clothes*," read "*rich cloths.*"

Page 329, column 1, line 7—for "*from 2½d. to 1½d. per yard,*" read "*from 2d. to 1d. per yard.*"

Page 376, column 1, line 51—for "*year 1853—85. William Nairn, of South Inch-mill, Perth.—Improvements in reeling yarns or threads,*" read "*year 1852—85. Joseph Brandeis, of 92, Great Tower-street.—Improvements in the manufacture of sugar and saccharine solutions.*"

Page 479, column 1, line 21—for "5,350,000 *tons*," read "5,350,000 *quintals* (= 100 lbs.), which would give 238,839 tons."

Page 479, column 1, line 24—for "*alone export 30,000 tons annually,*" read "*export a large portion of the 30,000 tons annually exported.*"

Page 486, column 2, line 65—for "*boasted,*" read "*lost.*"

Page 488, column 2, line 25—for "*I do mean,*" read "*I do not mean.*"

Page 587, column 1, line 31—for "*preserved alive in spirits, and others slightly opened,*' read "*preserved alive, and others in spirits, slightly opened.*"

Page 599, column 1, line 51—for "*empowering,*" read "*improving.*"